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APRIL 1949

BUSINESS · ENGINEERING · INDUSTRY

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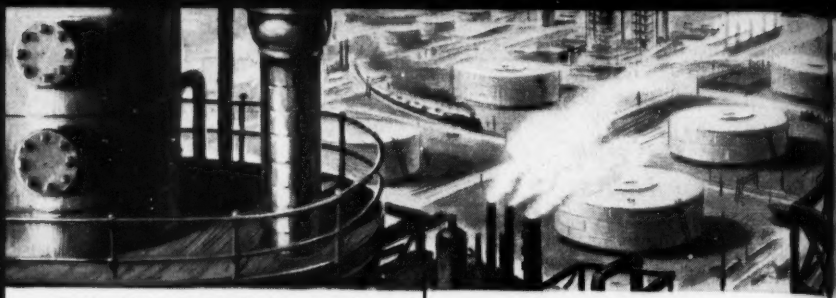

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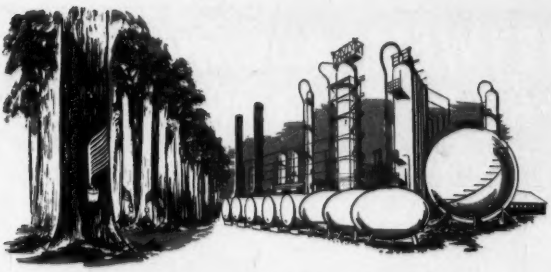

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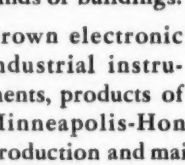

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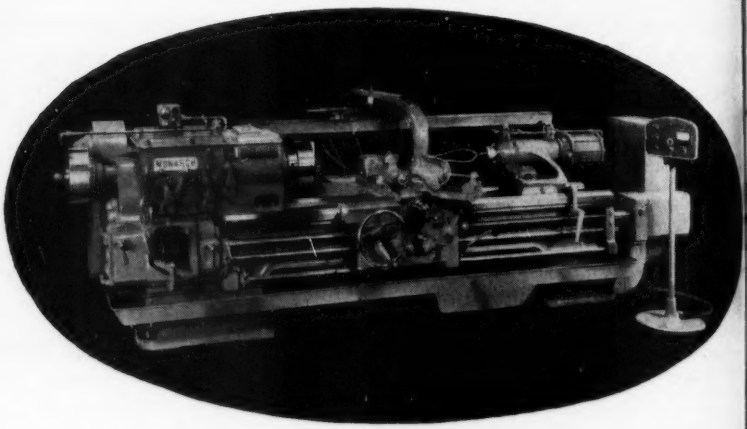

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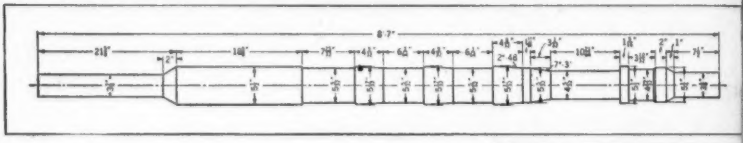

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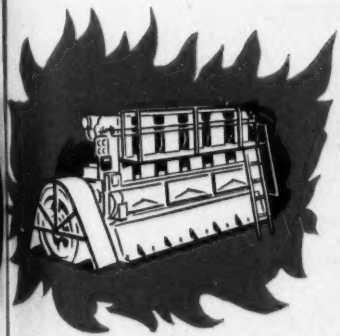

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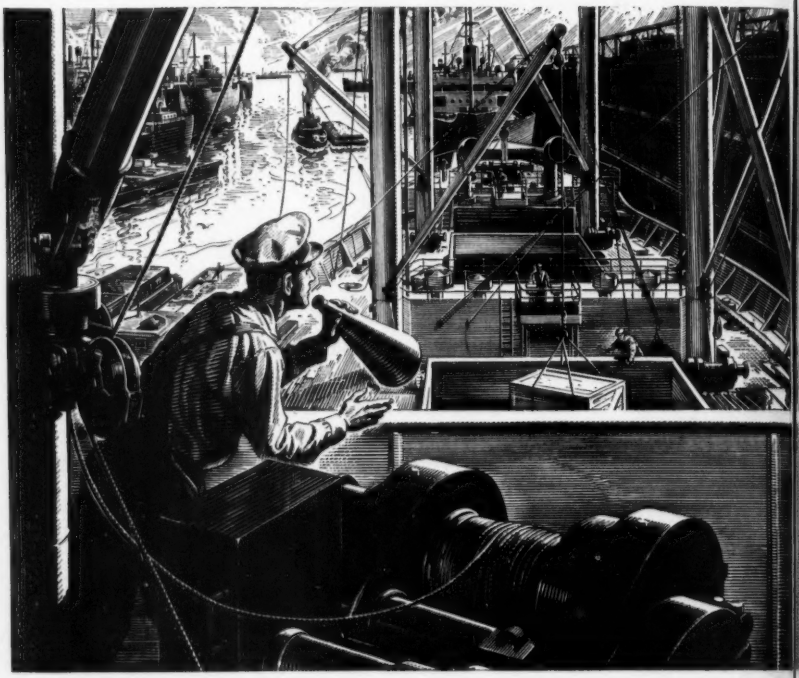

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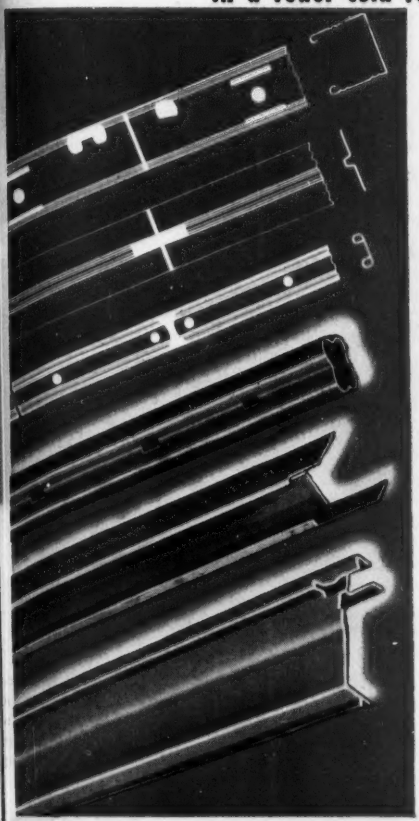

NO. 1 NOTCHING, PERFORATING, MAKING SPECIAL ENDS

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Illustration No. 1 is a Venetain blind header, No. 2 a furnace jacket ring, No. 3 a baby carriage section, No. 4 a lock-seam cloverleaf tube, Nos. 5 and 6 a window frame and sash section respectively. All the notches, perforations and special end profiles are made with special dies mounted in a Yoder automatic flying cut-off machine, synchronized with the roll forming machine. Into this line-up coiled strip is continuously pulled to be formed, notched, perforated and cut off at the rate of 100 f.p.m. or more, coming out at the other end as individual straight lengths, so accurately shaped and dimensioned as to be ready for immediate use or assembly.

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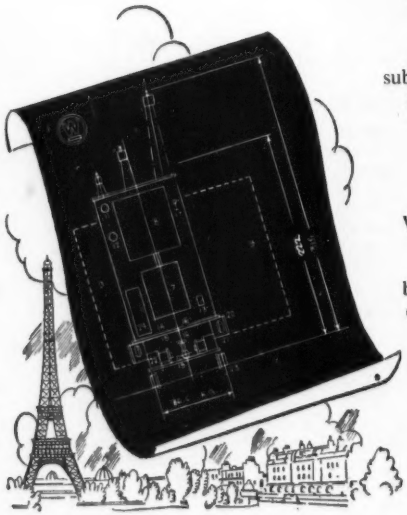

Electricité de France, one of the largest groups of utilities in Europe, specified a substation to transform 100,000 kva, 3 phase 215,000 volts to 60,000 and 11,000 volts. Each of the 3 single phase transformers in the substation had to operate in cells of such size that it presented a problem of physical limitations.

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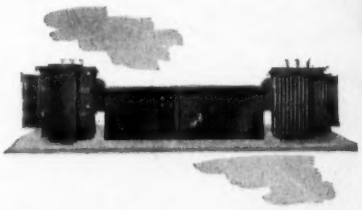

Westinghouse

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Westinghouse has long been recognized as a leader in the engineering and design of transformers over 500 kva with ratings up to 500,000 volts. Typical are: the Westinghouse Core Form Power Transformers rated at 501 to 5,000 kva single phase and 750 to 10,000 kva 3 phase; the Westinghouse Shell Form Transformers rated above 5,000 kva single phase and above 10,000 kva three phase.

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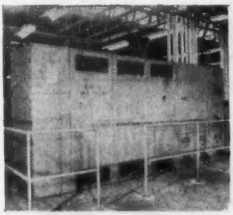

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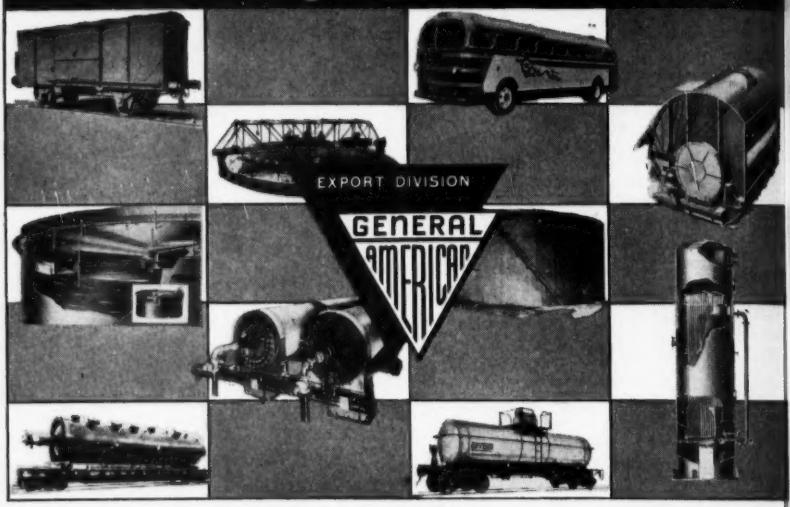

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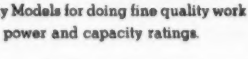

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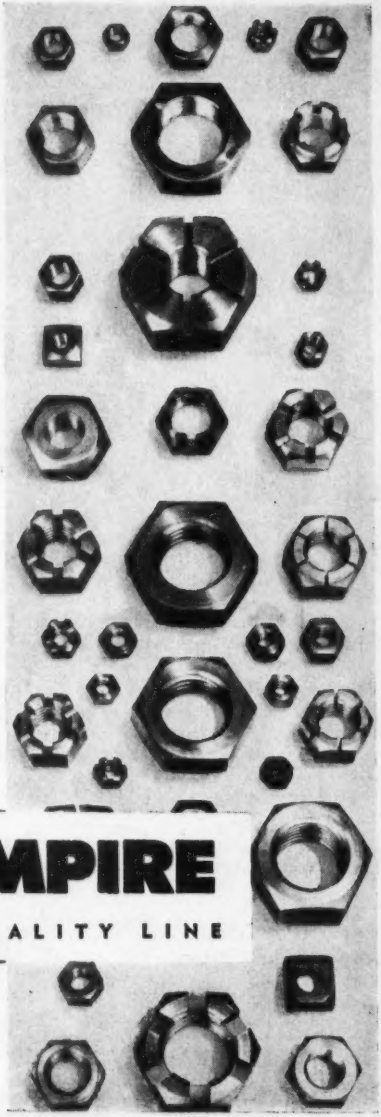

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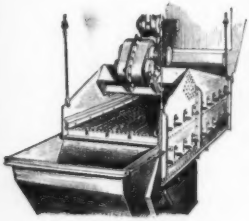

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Business Trends

THE BUYER'S MARKET in the United States, whether it is called that or called a correction—as forecast in McG-H Digest, Dec. '48, p11—has arrived in most lines. With few exceptions, it is rapidly appearing in practically all others. But it does not mean that the U. S. is necessarily entering a recession or is even on the verge of one.

It does mean that the "inflationary spiral" in the U. S.—and leading business analysts agree on this point—has passed its crest and started downward. It means that hesitation and slackening are in evidence. It means that weaknesses in several lines continue.

It means that industry as a whole no longer feels the extreme, constant pressure for production it felt a year or even 6 months ago. It means, too, that more members of Congress feel more hesitant to supply the President with his requested price and allocation controls.

A continued high level of prosperity is expected for at least the next 6 months. The ebb will be gradual, unlike the sharp and severe attacks that the U. S. economy has suffered in the past. The movement will affect world business and should be anticipated and watched closely by businessmen.

METAL SUPPLY AND DEMAND indicate well the position of the hard-goods industries. There now are signs of the first real improvement in the postwar steel situation. The gray market is crumbling, scrap prices are tumbling. Inventories are larger and some manufacturers have deferred or even cancelled orders.

Delivery times on stainless and tool steels are half those of late '48. Now quoted are 4-5 weeks for tool steel or stainless sheet, 8 weeks for stainless strip. Alloy rounds in large diameters are booked 4 months ahead, openhearth alloys 2 months, electric-furnace alloys 4-5 weeks.

Plates, ¼ in. and heavier, and cold-finished bars are still scarce. Structural-shape deliveries have improved. General improvement is likely to result from slackness in the appliance field, possibly less insistent demand from auto makers and the oil industry, and slowness in freight-car orders.

The aluminum outlook is not yet bright, but the frantic buying period is over. Secondary aluminum prices are trending downward. The lead situation is loosening; slashed production in batteries (25-40%) may signal a break in the high lead prices. Copper and zinc are unchanged—still tight, although a somewhat lessening demand for brass may affect copper requirements.

CHEMICAL DEMAND and consumption will rise a little this year, after a 5% increase in '48. Almost all types of paper are available in desired quantities, coal is abundant, petroleum is in line with demand.

Business Trends (Continued)

Fertilizer requirements are high, particularly of nitrogenous fertilizers because of world shortage. Paint continues high in demand and in good supply. Plastics, the fastest growing of chemical industries, will be in greater demand and supply this year as basic chemicals enter the buyer's market.

CONSTRUCTION EQUIPMENT, too, has reached the end of the postwar seller's market. A few exceptions are heavy crawler tractors and heavy power graders (10-12 months delivery time) and some types of power cranes and power shovels over 1½ yards in capacity (6 months).

On smaller items, firms are cutting production by 10%. Chief reasons for the sales dip expected to continue throughout this year are heavy buying in the past two years and pricing of potential buyers out of the market. But manufacturers, faced with high labor and material costs, see little hope of price reductions. Export sales are holding up well.

FARM EQUIPMENT (see McG-H Digest, Mar, p11) is continuing to move into better supply. Output in '48 rose 15% over '47, and production this year should equal last year's record in most items.

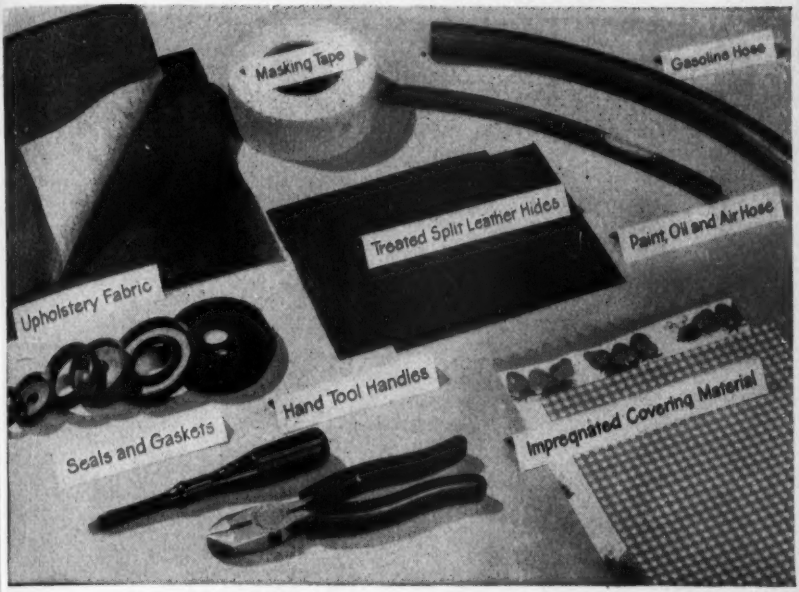
So-called premium prices on farm equipment are disappearing, except for the scarce larger units. By the middle of the year, prompt delivery will be possible on all but a very few items. Larger quantities of all items will be available for export.

COMMODITY PRICES, as well as equipment and material supply, are in a transition stage. Farm prices have fallen sharply, but will recover somewhat from the Jan.-Feb. slump. The long-term trend is downward, but the government's support program can be made more effective than indicated by its temporary failure, caused by shortage of eligible storage space.

Crop surpluses again face the U. S. This could mean more pressure on Marshall Plan countries to accept grain and other foods, whether entirely needed or not. Or it could mean lower prices for these countries to pay for what they need and, consequently, more money to spend on industrial goods. The latter looks more likely in view of the determination of Economic Cooperation Administration officials to make the program a genuine recovery effort.

Recent lifting of export controls on fats and oils to all but Marshall Plan nations is indicative of the whole commodity situation. Fats and oils have been in short world supply, but now supplies are more adequate. Predicted U. S. output is 10.5-billion lb. for 1948-49—675-million lb. over the previous year.

Removing fats and oils from export curbs is tremendously important to world trade in these commodities and also should help to counteract the recent severe decline in prices.



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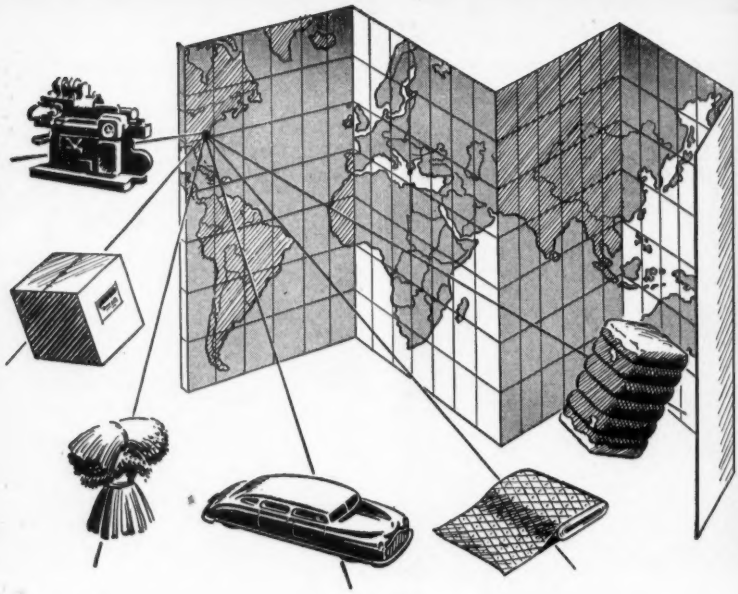

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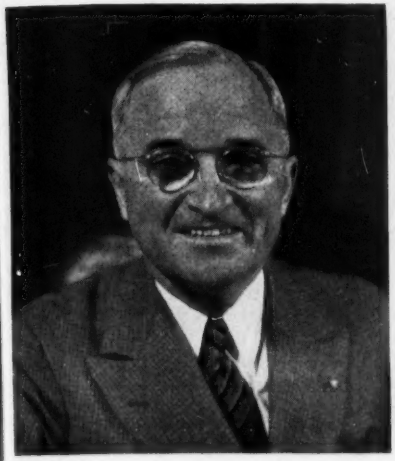
President Truman . . .



. . . "a bold new program."

Secretary of State Acheson . . .

. . . to attain freedom and dignity."

World Development Plan Urged

President Truman's inaugural address proposes a "bold new program" to carry U. S. technical knowledge to underdeveloped nations of the world

HIGH POINT for world business of President Truman's inaugural address was his statement that "we must embark on a bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas of the world."

The program, says Mr. Acheson, will "enable the individual to attain freedom and dignity . . . which should be the purpose of all government and all life."

Thus, the President committed the United States to a plan to send American technicians, technical skills, and dollars into the countries of Southeast Asia, Africa, the Middle East, and Latin America to bolster their economies.

It is not a definite plan . . . rather it is an idea. But the fact that it is still just an idea makes it no less important to the President than were it completely outlined on paper. It may evolve into a plan within 6 months.

Already it is evident that when the Marshall Plan has run its course there will still be a gap between dollar receipts and expenditures in most countries of the world. Development of the now-underdeveloped countries will help fill this gap. Dollarwise, the plan might prime the world's economic pumps with $1.5- to $2-billion a year with both public and private funds. It is not to be a 1-year program; planners see it extending into the 50's, the 60's, possibly the 70's.

It might work something like this:

Lending by Export-Import and the

World banks would be expanded. Technical intelligence teams under World Bank and U. N. organizations would formulate plans for agricultural and industrial development. American private capital would be encouraged to invest abroad.

The U. S. would throw its support behind international commodity agreements to help stabilize trade. The current U. S. stock-piling program would be extended beyond its 5-year goal.

Four basic propositions of the world-development plan are:

1. Lifting the standard of living in these underdeveloped countries as the best method to fight spreading Communism.

2. The Marshall Plan will fall short of its goal—balanced foreign trade budgets by 1952—by $1- to $3-billion even if imports from the U. S. are pared radically.

3. Economies of western European countries would be bolstered by increased productivity in their dependencies in Southeast Asia and Africa.

4. U. S. export business will be badly jolted at expiration of Economic Cooperation Administration unless another economic boost is given western European countries.

Plan Has Dual Role

About 75% of the $470-million loaned by the World Bank up to mid-1948 has gone for the purchase of American equipment. Under Mr. Truman's plan, the dollars would also be used to buy equipment in other lands, thus aiding dollar balances of those countries and aiding underdeveloped countries.

The role of the Expert-Import Bank is not likely to be as great as that of the World Bank. Its lendable capital is $900-million, being loaned at the rate of about $300-million a year. Most loans so far have been typical (conservative) bank loans, mostly for purchase of U. S. equipment. But the bank might undertake the guaranteeing of private investments and encourage equity capital.

The bank might:

1. Guarantee loans against war losses or against losses by expropriation.

2. Guarantee that capital plus a reasonable profit would be convertible.

The first of these guarantees would do the most toward encouraging U. S. private investors to enter the plan. Last year about $666-million of private money were invested abroad, over $450-million being investments in oil and mineral developments. When the oil and mineral investments slacken off, the total figure might settle at $500-million a year.

Needs—rough estimates only—for the underdeveloped countries in the next 10 to 15 years total about $30-billion, distributed $8-billion to Latin America, $6-billion for Africa, and $10-billion for Southeast Asia.

Plan may come into being in the following manner:

1. A study group under Secretary of State Dean Acheson will develop a plan in a few months to cover financing, registry of technicians, United Nations participation.

2. Technicians will visit underdeveloped countries to make on-the-spot studies of conditions.

3. Then U. S. and U. N. assistance would be offered to the country.

PLAN IN ACTION

Pennsalt International Corp., following the President's world development program, has announced that it will supply to England and France the latest production methods for the manufacture of fluorine and sodium subsilicates. Technical know-how, equipment, and raw materials will be supplied to them.

As the President's plan develops, more countries will find need for the benefits of American technical knowledge. McGraw-Hill Digest is equipped to supply executives with names of consulting engineers and firms familiar with techniques of surveys in all fields of business, engineering, and industrial endeavor.

Europe's Trade Barriers Lower

Trade between eastern and western Europe may reach $2-billion mark this year, $500-million ahead of 1948 but about the same amount behind 1939

TRADE BARRIERS between eastern and western Europe appear to be easing. Early in February eastern European buyers were in western Europe, offering food and raw materials in exchange for machinery and industrial goods. The easing of the barriers will be of mutual help to eastern and western Europe and to the United States.

With orders already in process, economists estimate that trade of approximately $2-billion will take place between the two sections of the continent. That would be about half a billion above 1948 volume and about half a billion below 1939.

The upswing in trade can be traced to three factors: (1) Russia's inability to supply to her satellites the capital goods they demand; (2) secession of Yugoslavia from the Russian sphere of influence; and (3) success of the Marshall Plan.

To western Europe, increased trade will mean less dependency on hard currency countries for its raw materials and foods. An agreement between England and Poland will send Polish eggs, bacon, cheese, and lumber to Britain through 1952. France will be helped by more Polish coal. French consumer goods will move to Poland.

Hungary will barter foodstuffs for $3-billion worth of Austrian cotton. Similar agreements between Austria, Romania, and Poland will follow. Austrian and Yugoslavian trade during 1949 will reach 42-million, Austria getting metals.

The United States' benefits will be more indirect than direct. By buying from eastern markets, western Europe will require less from U. S. resources. Trade pacts between Germany and Austria will reduce the cost of U. S. occupation in those countries.

Moscow plans for 1949 to increase its levies on eastern Europe's production. About one-third of the satellites' production will go to Russia during the year. Russian-Romanian trade will jump 250%; Russian-Hungarian trade 200%.

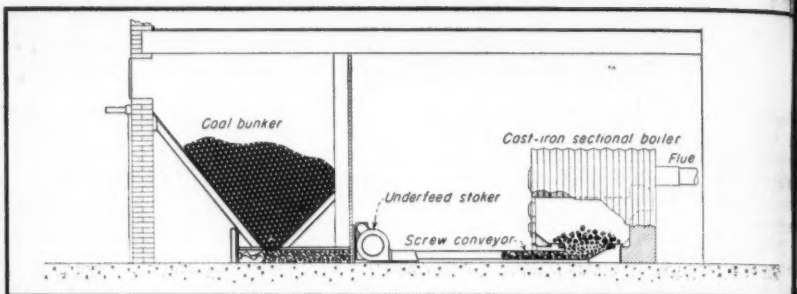
During the first three-quarters of 1948, Russia got between 60-70% of Yugoslavia's metals. This year Russia's share will run closer to 15%. This will make more metal available for western Europe and will make Russia enter the world metal market to satisfy her needs.

Russian trade terms with the satellites have been stiff. Last year Russian production was sold to them at approximately 30-40% above world market prices. In return Russia bought at a price 30% below market prices. This year conditions of trade have been eased. For instance, all Czechoslovakian trade will be at world prices with Russia paying half the freight and insurance costs.—Business Wk, Feb 5, p97

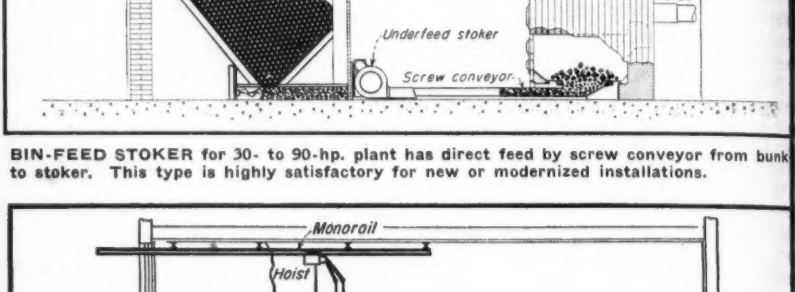
MARSH BUGGY

Marshes, swamps, potholes, bogs, or heavy underbrush will not stop this jeep fitted with a continuous road matting on rollers. Wheels of jeep pull matting forward over steel frame on top half of the oval. The matting and frame are now undergoing tests at a U. S. Marine base.—Cons Meth, Feb, p85

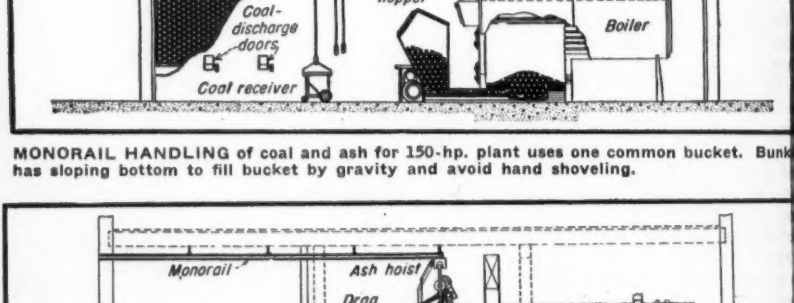
Layouts in Small Power Plants Show How . . .



BIN-FEED STOKER for 30- to 90-hp. plant has direct feed by screw conveyor from bunk to stoker. This type is highly satisfactory for new or modernized installations.



MONORAIL HANDLING of coal and ash for 150-hp. plant uses one common bucket. Bunk has sloping bottom to fill bucket by gravity and avoid hand shoveling.



DRAG CONVEYOR for 225-hp. plant moves coal to hopper of ram-type underfeed stoke Ash is handled by monorail hoist and ash container mounted on wheeled dolly.

Plants Can Cut Handling Costs

Small power plants, long neglected as to materials-handling methods, now are confronted with the necessity to reduce costs, improve operations

NOWHERE can modern handling methods in the power industry bring greater benefits than in small boiler plants, yet nowhere are they less used. Too often, the old way of men, shovels, and wheelbarrows persists in moving coal and ash.

But the trend is toward mechanization. Even plants burning only a few tons of coal each week have a choice of equipment for mechanical coal-and-ash handling systems.

The best arrangement depends on plant size and location, on whether the boiler room is above, below, or at ground level, and even on how coal deliveries are made. Equipment selection also depends on kind of load served—continuous basis or just for the heating season.

Saves on Hand Labor

Small coal-and-ash conveyors form the chief means of eliminating hand labor. They do away with labor, not only for filling coal hoppers but for cleanup as well. Other automatic features that should be incorporated in a small boiler plant to avoid need for constant attention are a low-water cutoff and combustion controls to vary burning rate. Operators then have only to make periodic checks and remove ashes.

For a 30-hp. plant, the bin-feed stoker is usually found most satisfactory and lowest in cost for new installations or for modernizing a hand-fired plant. When a hopper feed is already installed, it can be mechanized by a screw conveyor for moving coal from bunker to hopper. Typical boiler-room layouts for 90-hp. plants closely resemble those for 30-hp. plants. Where free-burning coals are available, small chain-grate stokers prove well suited to low-pressure heating service. A screw conveyor can remove ash discharged from the moving grate. For 30- to 90-hp. plants, savings in fuel and labor can pay the mechanization cost in about 1 year's operation.

For a 150-hp. plant, more completely mechanized handling is economically justified. One satisfactory arrangement is a monorail system for handling both coal and ash. The coal is fed directly from bunker to carrier, hoist-supported on the monorail.

Another arrangement carries coal from bunker to hopper by flight conveyor, while ash is handled by monorail-supported ash receiver. Automatic switches on stoker hopper insure a reserve of coal on hand. For direct lifts from bunker to boilers on a higher level, a bucket elevator may be combined with a horizontal screw conveyor.

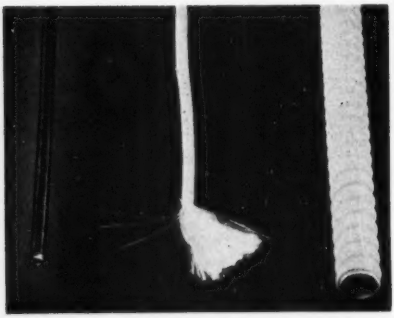
Ash disposal in 90- to 150-hp. plants may be troublesome, as such city plants are generally located below ground level. Recommended handling methods are simple bracket-type hoist, combined hoist and hatch way, or platform elevator.

More Mechanization Needed

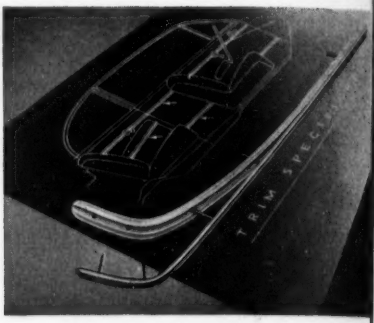
Larger plants—225 to 300 hp.—require still greater mechanization for low operating costs. A typical installation for an underfeed stoker includes drag conveyor for moving coal from bunker to hopper and a motor-operated monorail hoist for ash handling.

Coal conveying between bunker and boiler can be handled readily by a pneumatic spreader stoker, while a mechanical spreader stoker can be fed by a bucket elevator. A simple but more costly system has an overhead storage bin.

Ash removal of these larger plants vary widely in degree of mechanization—from wheelbarrow to pneumatic systems actuated by steam jets or vacuum pumps.
—Power, Feb, p91



VINYL extruded over (l. to r.) coil spring, fibers and wire, butyrate on wood.



Trim strips to hold automobile upholster can be made of extruded plastic.

Extruded Plastics To Expand

Equipment sales jump during 1948 with an equal expansion expect this year; indicates extrusions to be more widely used in futu

GREATEST ADVANCES expected in the field of plastics in the next few years will undoubtedly come in extrusions. New materials and equipment now make it possible to offer extrusions to new markets, at low cost—through low die costs, continuous operation, and versatility of equipment. New equipment and materials permit extruded plastics to compete with rubber, paper, natural fiber, wood, and leather.

Extrusion-equipment manufacturers report a 50% increase during last year, and expect a 50% increase again this year. By 1950, an expected 1,800 extruding machines will be in operation in the U. S. with a similar increase in equipment in other countries.

Primary use of extrusion today is in the field of coated (labelled) electrical wires. Dielectric properties of vinyls, polyamides, some copolymers, and polyethylenes, their resistance to chemicals and atmospheric attack, and their light weight make them especially valuable in the wire field.

Used with alkyds and asbestos, vinyls are satisfactory as fire and undergroun protective coatings. Ability to with stand high voltages makes polyethyler useful for underground power cable Nylon—inert to chemicals—is being e truded at 1,600–2,000 ft. per min. coating over No. 20 wire.

Second to coated wire in volume a flexible extruded strip gaskets. Refri erators, automobiles, airplanes, hous hold appliances, steel window frames a possible and actual markets. In the ne Lustron prefabricated house (see McG-Digest, Feb, p38) polyvinyl chlorid sealing strips are compressed betwee enameled-steel strips to seal the house.

For such air- and water-proofing use the extruded polyvinyl chloride wit stood 1,900 hr. of standard Weatheron eter test whereas rubber began to harde and crack after only 60 hr. of exposur

About 80% of the available polyethy lene is being extruded as thin sheets an tubes for packaging consumer product and wire coatings. The polyethylene i sold for 46–52¢ per lb., depending o quality; extruded as sheet or tubing,

sells for 71¢ per lb. Converting is profitable only if extrusions exceed 1.5-million lb. per yr. For packaging, vinyl sheets below 0.005 in. thick are cheaper to cast than extrude.

Extruded polystyrene sheet, either oriented or unoriented, is being used as storage-battery separator plates and spirally wound shells for dry-cell battery cases. It may be employed for electrical spacers and washers.

Dry extruded acetate sheets can be produced profitably at low cost. Machines are producing polished sheets at 200–400 lb. per hr. Even though sheets are not quite clear, it is satisfactory as a packaging material. Primarily used as wound dressings, modified nylon film is being produced in sheets 0.003 in. thick. It can be sterilized without damage.

Permitting 92% or more light transmission, extruded polystyrene is finding wide use in fluorescent lighting fixtures. Vinylite compounds, extruded at low die temperatures, are being used similarly. Plastic fluorescent fixtures cannot compete pricewise with acid-etched glass, but can compete with enameled or pigmented glass.

Extruded ethyl cellulose formulations are now being post-formed as tubing; swedging and tapping are done on dies and special tools. Plastic Saran piping and pipe fittings have been produced for some time, being used extensively in chemical manufacturing. A modified styrene extruded pipe, inert to chemicals, concentrated acids, and alkalies, has been developed to take pressures up to 650 psi. Pricewise it competes with steel pipe.

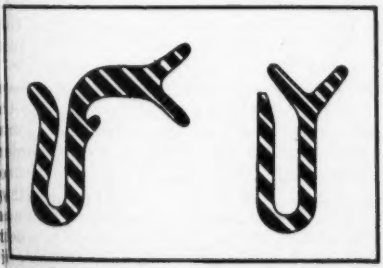
Fibers, rayon, cord, yarn, and paper cord are being coated by extrusion methods. Colored and multi-colored extrusions are becoming more frequent

Multicolors can be extruded by four methods: (1) twin or multi-screw extruders feeding a common die, (2) two-step operation in which one-color extrusion is covered by a second color in a crosshead, (3) a small single cross-section of a single color being covered by a second color, and (4) extrusion and stocking strips joined by welding.

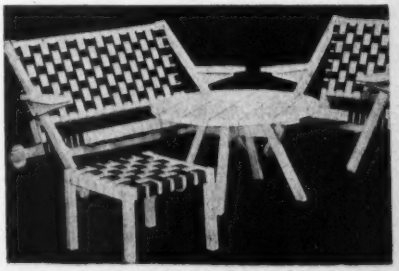
Single Unit Mill, Extruder

Highly important to the field of extruded plastics is the Millstruder developed by National Rubber Machinery Co. (See McG-H Digest, Jan, p46.) Essentially a mill and extruder combined, the flights are inside the chamber and screws serve as mixing rolls, forcing the plastic against and through the flights. Unit has a 1,000-lb.-per-hr. capacity. It can compound thermoplastics after plasticizer, pigment, and resin have been given a first mix.

In thin-section molding, pigmentation is superior. Coloring of polystyrene is done in one-third normal time.—Mod Plastics, Dec, p75; Jan, p79, Feb, p68



CROSS-SECTION of gaskets used to waterproof Lustron's enameled-steel house.



EXTRUDED polyethylene strips form novel seating for outdoor furniture.

Enameled Aluminum Process Developed for 43, 61-S Alloy

Vitreous enamel has been applied successfully to wrought 61-S alloy and cast 43 alloy aluminum on a laboratory and small commercial basis by a new process developed by Du Pont.

Compared to vitreous enameled steels, the new product has superior impact and flex resistance, excellent resistance to thermal shock, and does not rust if metal is exposed. It may be sawed and to a degree formed on the job. High lead content of frit makes the product unsuitable as a food container.

Metal stock should not be anodized or treated by strong corrosion-inhibitive cleaners; corners and edges should be rounded. Enamel may be applied over weld seams.

Following pretreatment, stock is prefired, cooled to room temperature, and sprayed with a thin ground coat, 15–20 g. per sq. ft. being deposited. Ground coat is dried at low temperatures, as high temperatures might possibly cause tearing.

After drying, stock is heated for 5 min. at 970–1000° F. Then cover coat is applied, 40–70 g. being deposited persq. ft. If non-rigid sections are used, both sides should be sprayed to avoid warping. Firing conditions following finish coat are the same as for ground coat.—Ceramic Ind, Jan, p73

Determines Tin Content

Tin in copper-base alloys can be accurately and rapidly determined by a volumetric method wherein sample is dissolved in 30% hydrogen peroxide and hydrochloric acid and tin is separated from copper by ammonium hydroxide precipitation. Reduction is accomplished by the patented alloy Stanreduce.

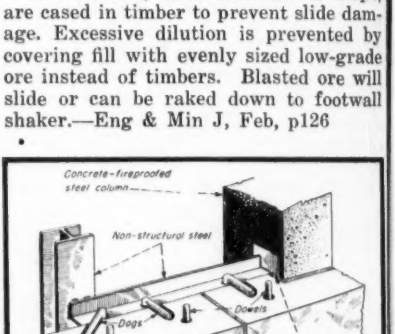
One serious difficulty is encountered in filtration of precipitated hydroxides when tin content is over 5%. Filtration can be speeded up and trouble in washing eliminated by adding a lead salt with the iron.

The amount of potassium iodide added to standard solution is augmented by a further addition to the solution before titration. These changes give a method by which a sample can be tested in 20 min.—Foundry, Feb, p87

Conveyors Backfill Stopes

Shaker conveyors backfill stopes and transfer ore in lead-zinc mines in the Harz, Germany, area. Two methods were employed in cut-and fill stopes inclined at 45°. In one, shaker conveyor carries fill only. Other carries ore and fill.

Ore shakers, near footwall of stope, are cased in timber to prevent slide damage. Excessive dilution is prevented by covering fill with evenly sized low-grade ore instead of timbers. Blasted ore will slide or can be raked down to footwall shaker.—Eng & Min J, Feb, p126



EARTHQUAKE ANCHORS

By these galvanized dogs, stone facing is being attached to nonstructural framing for earthquake protection in New England Telephone & Telegraph Co.'s new Boston 20-story office building. Dogs are ⅞ in. dia. and tie alternate courses of stone to light grids of T and H steel. Courses are doweled to each other by ¾-in. brass pipe 4 in. long. Dowel holes are factory cut. Dogs and dowels are grouted in place.—Eng News-Rec, Feb 3, p69

Standardized Power Plant Simplifies and Saves

In an effort to combat rising costs, Burns and Roe, Inc., has developed plans for large standardized power plants. Projected capacities are 20,000, 30,000, 40,000, and 60,000 kw. The first plant built, a 20,000-kw. unit, is now near completion.

The turbo-generator is mounted on and supported by the condenser and has no parts of unequal vertical height. The condenser is a cross-flow singlepass type, which has longer than normal tubes. This gives the highly desirable characteristics of a two-pass condenser

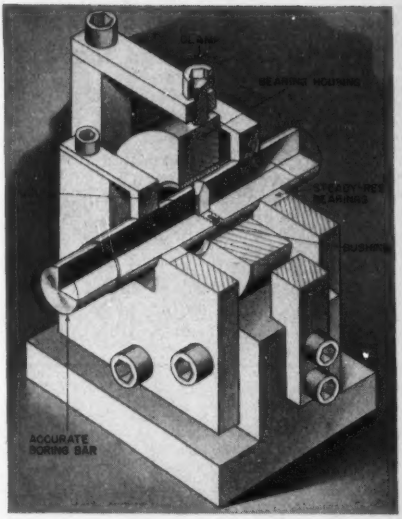
In a 30,000-kw. or larger unit, one or more direct-contact low-pressure heaters would be installed between tube banks and under turbine exhaust. They would be integral with condenser. Other direct heaters would be external to condenser.

Advantages of standardized design include: saving of 7-10% in construction costs; reduction in building size with headroom lowered from conventional 25-34 ft. to 18-24 ft.; important equipment confined to operating floor and basement; maximum factory fabrication; and excellent flexibility.—Elec World, Feb 12, p81

Lowers Coal Moisture to 3%

Developed by the U. S. Bureau of Mines, a pilot-model coal drier, handling four tons per day, reduces moisture content of coal from 25% or more to 3%. Combustion chamber is fired by low-oxygen gas. A chrome-alloy diaphragm separates stack and chamber. Powdered coal is blown into the stack above diaphragm. Gas dries coal almost instantly.

Coal drops into receiving drum. While moisture content drops to 3%, heat value rises from 8,500–11,500 Btu. per lb. In a commercial plant, drying would cost 20–40¢ per ton. Pilot model will handle any type of coal, even lignite.—Business Wk, Feb 12, p63



BORES TO HIGH TOLERANCES

Battelle Memorial Institute has devised a boring method to hold tolerances on 1¼-in. dia. to 0.00001 in. Boring bar is supported on two ends in bearings faced with silver solder. With fixture mounted on lathe carriage, bar is driven by lathe spindle through a pair of universal joints. Workpiece is clamped in a rigid housing between bar supports. Accuracy of method depends on bar and supports, not the lathe.—Am Mach, Feb 10, p89

Crimp Improves Yarn

Increased crimp in filling yarns results in greater fabric elongation according to tests of cot covers made by the U. S. Quartermaster Corps. Yarn and fabric strength were eliminated as significant factors. Tests were conducted on chafer ducks of spun nylon, filament high-tenacity viscose rayon, and specification duck.

Nylon has the best durability; rayon proved a little better than cotton but did not recover after first impact test. Filling crimp ranged from 1-2 to 1-20.7. —Textile World, Feb, p155

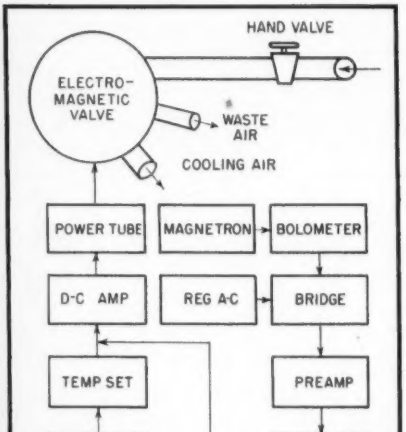
Save $300,000 in First Year With Better Salvage Method

New scrap-sorting methods adopted by Glenn L. Martin Co. returned $300,000 plus substantially increasing returns on sale of scrap metal and paper. All the material salvage is handled by a staff of 19 workers with 12 performing the direct salvage operations.

Large single item of salvage profit, $120,912, was derived from reclamation of nuts, bolts, and other standard items. Screened containers, placed about the plant, collect the scrap and floor sweepings. This is run through a revolving screen parts sorter with graduated apertures. Screened scrap is then broken down into basic component parts by hand, permitting discard of damaged parts. Jigs and fixtures greatly speed hand sorting.

Screening of scrap has saved $151,843. This includes all plant-generated trash, cut-offs and scrap from manufacturing, and obsolete, surplus, or defective equipment. Segregation of scrap has doubled its value. By hand picking better grades of paper out at incinerator, 1,148,522 lb. of paper is saved for sales.

Salvage of discarded wood about the plant produces 461,481 ft. of usable seasoned lumber. Nailed ends were sawed off.—Factory, Feb, p118



STABILIZES TEMPERATURE

Diagram shows an automatic temperature stabilizer for a magnetron oscillator. Bolometer touches magnetron and is connected into bridge circuit. Bridge output voltage varies with bolometer resistance (magnetron temperature), and is amplified and rectified. Dc. voltage is superimposed on variable bias from potentiometer, and voltage difference applied to dc. amplifier controlling power-tube grid. Plate current of tube controls valve that regulates cooling air.—Electronics, Feb, p144

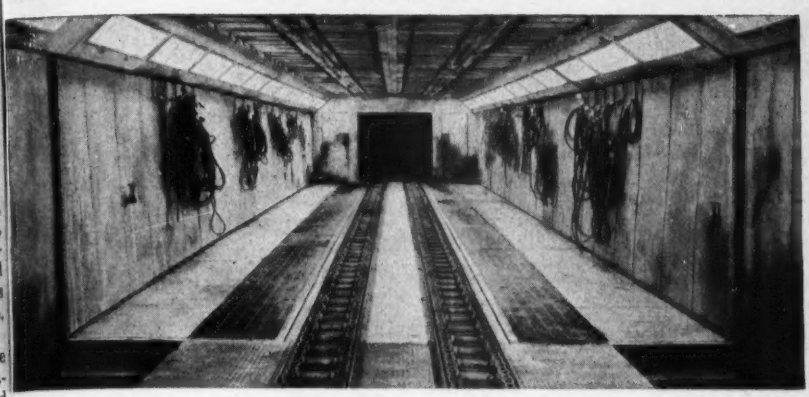
Super DC-3 To Carry 26-28; Wing, Empennage Modified

Douglas Aircraft Co. has announced plans for a Super DC-3 to carry 26-28 passengers. Plane will cruise at 235 mph. Direct operating costs will be 1.25¢ per seat-mile in the 28-passenger version and 1.75¢ per seat-mile in the other.

Structurally, main changes are in the wing and empennage. Wing will be swept back about 4° in the outer panels. Area and span of tail surfaces will be increased proportionally to the increased design load. The 28-passenger version will have two 4-passenger divans.—Aviation Wk, Jan 31, p12

Waterwheel Leveling Target

Indiana & Michigan Electric Co. checks horizontal waterwheel shafts each year and adjusts bearings to keep shaft centers aligned horizontally. Checking has been simplified by replacing the usual level target with a special target. This target has scales that indicate directly and without calculations when any bearing on any waterwheel is at correct elevation.—Elec World Feb 12, p114



SPRAY-BOOTH interior is lighted with vapor-proof fluorescents, while ceiling-recessed blowers and sub-floor exhaust ducts remove paint vapors

Features Power Distribution

New Ford automobile assembly plant is a model of modern, efficient power distribution designed to serve capacity without interruption

LINCOLN-MERCURY assembly plant at Metuchen, New Jersey, has 584,000 sq. ft. of floor area, assembly facilities for 350 cars daily, a 914-ft. final-assembly line, and a 40-boxcar inside double-track railroad spur.

To insure continuous plant operation, primary power is delivered to plant's substation at 26,400 volts by three overhead lines. Here the current is stepped to 13.2 kv. for high-tension distribution through two delta-star, oil-filled, air-cooled transformer banks.

Plant distribution between substations and buildings is through underground concrete-sheathed, 4-in. fiber duct. Where loads are concentrated, ducts are of steel. From main substation to control center and then to the individual substations, primary underground distribution is through 3-conductor, 15-kv. lead-covered cables with grounded neutrals.

Eight secondary transformers, located in three substations, step current to 460 volts for general plant power. Over 7,000 ft. of bus duct is installed in the 460-volt distribution system. This includes 640 ft. of 3,000-amp. low-impedance bus tie, over 2,100 ft. of 1,350-amp. Lo-X feeders, and 4,200 ft. of plug-in busduct.

The lighting load is satisfied by 36 air-cooled 480–120–208 volt, 3-phase, 4-wire, 60-cycle transformers having a 1622.5-kva. capacity. Illumination is almost exclusively fluorescent, units having both commercial and industrial type reflectors with one to four 40-watt lamps.

These units are chain-suspended from parallel runs of trolley duct. Duct runs, in turn, are suspended by messenger cable runs terminating at turnbuckle anchors attached to lower flanges of roof-truss chords.

Incandescent lamps are used for high-intensity illumination for critical inspection and assembly. Light is also utilized for purposes other than illumination,

such as for photoelectric cells to operate protective interlocks, activate conveyors, and orient automobile headlights.

Practical electrical application methods are numerous. One example is utilization of hot-rail, tell-tale lights mounted at intervals along the monorail carrying trolley feeders for a traveling crane. Should a ground develop, a lamp goes out, indicating it immediately.

Another practical installation is the interlocking system on the assembly lines to protect traveling products, equipment, and workers.—Elec C&M, Feb, p67

Synthesizes Formaldehyde by Burning Methyl Alcohol

Formaldehyde for use in making phenol-formaldehyde resins is now being synthesized by Durez Plastics & Chemicals, Inc.

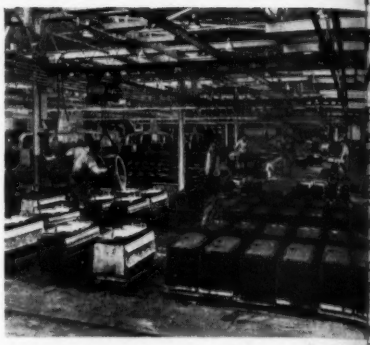
Methanol is vaporized in a steam-heated vaporizer, mixed with sulphur-free air, and fed to a converter where oxidation and dehydrogenation occur simultaneously. Hot converter gases are immediately quenched in a primary absorption tower by liquor containing 28–30% formaldehyde and 20–22% methanol.

Some liquid flows to the F-M liquor tank, while most of it is cooled in a trombone cooler. The gases pass to a secondary absorber where remaining formaldehyde and methanol are stripped against a flow of distilled water.

The F-M liquor is then distilled to recover unreacted methanol and produce a bottoms product containing formaldehyde in water solution. The bottoms product is cooled and pumped into storage where it is diluted to 37–37.5% formaldehyde.—Chem Eng, Feb, p130, 146

High Bitumen Recovery

U. S. Bureau of Mines has succeeded in recovering 95% of the bitumen from bituminous sandstone. The bitumen can then be used to make gasoline, coke, and other products.



FLEXIBLE MOLD HANDLING

Pallet line at Belle City Malleable Iron C uses 2x5-ft. pallets, mounted on wheels they can travel by gravity over tracks b tween molding stations and shakeout. Hall mi metal is brought to pouring station by li truck in 1,000-lb. ladles and spotted alo lines on monorail system. Pallets automat cally dump load at shakeout and return lower track.—Foundry, Feb, p136

The sandstone is disintegrated in a r volving screen drum and carried b screw conveyor to a multistage counte current washer where water-soluble ir and calcium salts are removed. Washe bitumen forms an alkaline froth wh fuel oil and aqueous solutions of soda as and silicate are added.

Oil froth is recovered in a hot-wat multicell flotation unit. Some impuriti settle out in a tank containing hot wate while final purification takes place in second settling tank.—Chem Eng, Fe p14–PPI

FREE SERVICE TO READERS

As a special service to our subscribers, McGraw-Hill Digest will furnish, without any charge additional information about any new product technical development described. Address your letter to: The Editor, the McGraw-Hill Digest 330 West 42nd St., New York 18, N. Y. U. S. A. —THE EDITOR

Particle Size Distribution Affects Sand Properties

Physical properties of molding sand, as affected by additions of selected sieve fractions of silica sand, were investigated by the U. S. National Bureau of Standards. Basic material was an Albany sand with AFS fineness number of 161. Additions were 10, 20, and 40% of Nos. 50, 100, and 200 sieve fractions of washed silica sand.

It was found that fine sand grains were more effective than coarse grains in influencing green permeability and green strength of the molding sand. As percentage of added sand fractions increased, green permeability increased for all mixtures.

The 40% addition of No. 100 sieve fraction gave the highest permeability value. All mixtures containing additions of the No. 100 sieve fractions had higher permeability than those with Nos. 50 or 200, indicating that there may be some critical particle size.

All additions resulted in reduction of green strength. The amount of change in each instance was roughly proportional to the amount added.

A relationship was found between physical properties and distribution indexes for all mixtures. As distribution indexes increased, permeability increased, strength decreased.—Foundry, Feb, p66

Huge Supersonic Wind Tunnel

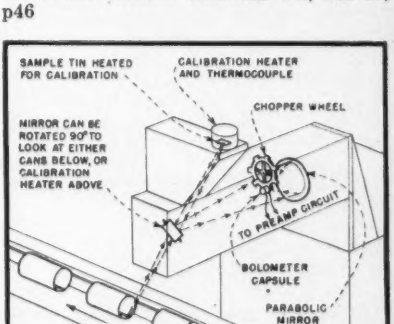
NCAA's wind tunnel, to generate speeds of 1,370 mph., will be powered by three electric motors generating 87,000 hp.—the greatest amount of power ever placed on a single shaft by electric motor drive. System has an overload capacity of 100,000 hp. This power is necessary to turn the 7-stage, 600,000-lb. compressor.

Motors operate in perfect synchronization, controlled by ship-regulators. Each regulator is a 20-ft. tower containing an electrolytic salt. Moveable electrodes, controlled by hoists, give equal resistance by regulating distance between them.

Motors are started in tandem, the first motor being accelerated to 50% full primary load before second is cut in. The same procedure is used for starting the third motor.—Aviation Wk, Jan 24, p20

New Glue for Redwood Veneer

Two problems of redwood veneer have always been the presence of tannic acid and alkali content. The former made the wood resistant to most moisture-resistant glues; the latter combined with the tannic acid to form a dark stain. M & M Wood Working Co. has announced a new thermosetting phenolformaldehyde glue which overcomes the two difficulties. Under hot-plate presses the glue becomes insoluble alkaline, drying before it penetrates the veneer.—Business Wk, Feb 19, p46


SAMPLE TIN HEATED FOR CALIBRATION
CALIBRATION HEATER AND THERMOCOUPLE
CHOPPER WHEEL
MIRROR CAN BE ROTATED 90° TO LOOK AT EITHER CANS BELOW, OR CALIBRATION HEATER ABOVE
TO PREAMP CIRCUIT
BOLOMETER CAPSULE
PARABOLIC MIRROR (FRONT SURFACE)
CAN SEAMS AT BOTTOM

INFRARED PYROMETER

Temperature of soldered seams of moving tin cans is measured by infrared pyrometry. Infrared energy is picked up by optical system and passed through chopper wheel to thermistor flake in bolometer capsule. Signal from bolometer circuit is amplified and fed into cathode-ray oscilloscope for temperature indication. Pyrometer is calibrated by observation of heated tin sample.—Electronics, Mar, p112

Knitting Machine Down Time, Cause Automatically Charted

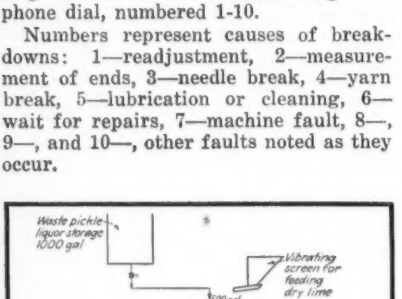
Time and causes of machine breakdowns in Aktiebolaget Sveriges Forende Trikofabriker, Boras, Sweden textile mill, are recorded automatically on continuous charts in a central recording room. Mounted at the side of each knitting machine is a dial resembling telephone dial, numbered 1-10.

Numbers represent causes of breakdowns: 1—readjustment, 2—measurement of ends, 3—needle break, 4—yarn break, 5—lubrication or cleaning, 6—wait for repairs, 7—machine fault, 8—, 9—, and 10—, other faults noted as they occur.

When a machine stops, operator dials number designating cause of stoppage. Stop-cause signal is transmitted to the central control room where operation of each machine is recorded by a recording machine.

The stop-cause number is printed on the machine's chart and the scriber stops but tape continues to move. Tape is graduated by hours in 10-min. increments to simplify reading of productive and non-productive time. When stoppage has been corrected, scriber starts automatically.

At the end of the day, total down time for each cause is transferred to a master table. This information is a major asset in visualizing and correcting stoppages. —Textile World, Feb, p122



PICKLE-LIQUOR DISPOSAL

Waste pickle liquors can be disposed of without lagooning, by treating with dry lime. Mixing liquor and lime results in a granular, readily dewaterable sludge, which is then passed through centrifuge or vacuum filter to form a sludge cake. Effluent is passed through polish filters, if necessary, to remove any remaining suspended solids.—Iron Age, Jan 20, p48

Protects Grain Elevator

National Oats Co. has installed an automatic carbon-dioxide fire-extinguishing system in a grain elevator. It gives 24-hr. protection against fires.

The CO_2 is stored as a liquid under 850-psi. pressure in 18 cylinders manifolded together. They are connected by rigid piping to a series of discharge nozzles mounted in the walls of the cooling and drying chambers.

Any excessive rise in temperature puts the system into action by use of a Lowe rate-of-temperature-rise actuator. Essentially, this is a metal air chamber with a bellows mechanism. Any rapid temperature increase creates a shock wave of air pressure that is transmitted to cylinder valves.—Food Ind, Feb p115

Pneumatic Tires for Train

On the 270-mi. run from Paris to Strasbourg a 6-coach train is fitted with pneumatic, steel carcass tires. Two bogeys per car mount 10 pneumatic tires. Steel disk wheels, fitted with automobile-type brake drums, are used. Tires are inflated to 128 psi. and are said to last through 21,000 mi.—Auto Ind, Feb, p39

Textile Supply-Demand Balance

Countries are rapidly approaching self-sufficiency in cloth but raw materials production, except for synthetics, will remain localized

SELF-SUFFICIENCY, or rapidly approaching self-sufficiency, predominated the world textile picture in 1948. Recovery in the industrial countries of the world took a large step forward during the year. Textile industrialization is appearing among some of the more primitive peoples of the world.

Construction of local spinning and weaving mills is making the countries independent of other nations so far as processed cloth is concerned. Raw-material production will not be shifted so easily. Cotton growing will remain in the present centers—the United States, India, Russia, Brazil, and Egypt. Australia, South Africa, the U. S., and Argentina will continue to supply the world's wool. Ireland, Belgium, and Russia will grow the flax, while Pakistan and India will supply the jute.

Synthetic fibers, on the other hand, are being produced more widely for local processing. Expanding capacities will soon make most countries self-sufficient in the synthetic field. Country by country, the world's textile picture is as follows:

Argentina—Production of all types of textiles increased during the past year. Textile men however are worried over prospect of over-production in 1949. The historic markets of South American textiles—England, Italy, and Brazil—seem to be lost. Argentina's textile industry cannot compete in the export market. The country's first nylon plant—the first in South America—will go into production during 1949.

Brazil—A dwindling export market is turning manufacturers to Argentina. Under the Argentina-Brazil trade agreement, Brazil will continue to export textiles to her neighbor at high prices in exchange for even higher-priced meats. In reality, the Brazilian population is to continue subsidization of the textile industry.

Mexico—Modernization and expansion were great in the country during 1948, restricted only by inability to procure equipment. These restrictions eased somewhat from what they were the preceding 5 years. In the absence of rumors of nationalization of the textile industry, a little foreign capital is entering the field.

Belgium—A slump in business was noted during the past year, following widespread expansion immediately after the war. Cotton stood at 74% capacity, wool at 85%. Even with the lifting of the 3% export tariff, exports remained

TRANSPARENT DUST MASK

Cleaning milk spray drier at Kalamazoo Creamery Co. was made a cleaner job for workmen by using Pliofilm bags as masks. Air was fed into bag from small compressor. —Food Ind, Jan, p74

below expectations. The country is self-sufficient in wool machinery.

France—As the country's leading export item, textiles bring France 14% of its dollars, 60% coming from wools. Ninety percent of the raw materials must be imported. Expansion of exports has lagged, as has cotton production, because of import curtailment.

Great Britain—Rayon-yarn production set new records during 1948, October production exceeding the previous year's figure by 11%. Filament production is up 25%, staple up 15%. Cotton production was 100-million lb. below expectations. Labor shortages are blamed. Exports of all textiles continue at a surprising rate but appear to be leveling off—levelling being speeded by import restrictions by former buyer-nations.

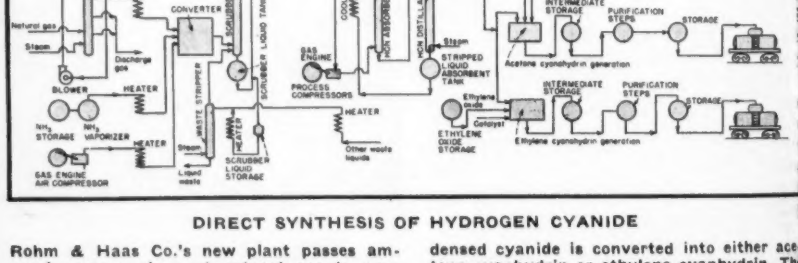
Italy—Outlook within the industry is bright. With profits earned immediately following the war, manufacturers are improving production methods, buying new equipment. It is probable that the industry this year will reach or exceed the ERP goal for 1953 of $380-million. Synthetic fibers remain Italy's textile export item, although production has not been increased.

Russia—Soviet textile industry is operated as a self-contained industry both raw materials and machinery although there has been some buying of wool from Australia and cotton from the U. S. The 1950 goal set by the current 5-year plan is 8-million spindles.

China—The bright future expected a year ago for Chinese textile industry disappeared with the Communist successes in that country. About 65% of the country's mills are located in eastern China centered in Shanghai and Wusih. Many of the threatened mills have curtailed production, shut down, or moved south.

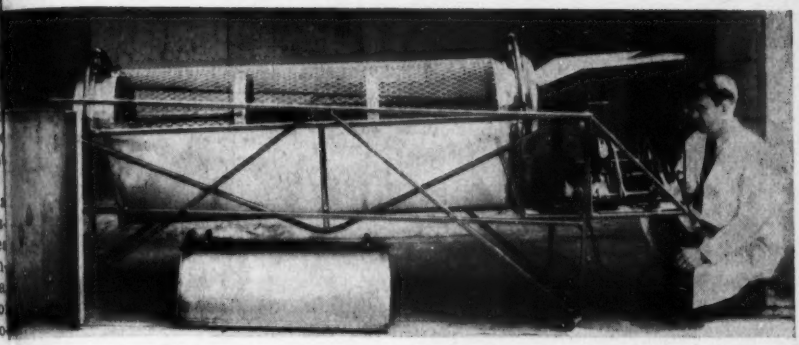
Japan—Production was slightly higher in 1948 than in 1947. Bilateral trade agreements with sterling-area nations will help the industry during 1949. Barter with India, the United Kingdom, Australia, New Zealand, Netherland's East Indies, Siam, and Burma will also bolster it.

India—Recovery of the cotton industry was the brightest aspect of the total industrial picture. The year's production is expected to total 4.5-billion yd., slightly below the wartime peak but above peacetime levels. A few mills have been built —Textile World, Feb, p109



DIRECT SYNTHESIS OF HYDROGEN CYANIDE

Rohm & Haas Co.'s new plant passes ammonia vapor, air, and natural gas to converter holding platinum catalyst. Converter gases are scrubbed, compressed, and passed through absorber for hydrogen-cyanide removal. Cyanide liquor is distilled, and condensed cyanide is converted into either acetone cyanhydrin or ethylene cyanhydrin. The first is used in making methyl methacrylate monomer from which Plexiglas products are made. Most of the ethylene cyanhydrin is used for acrylates.—Chem Eng, Feb, p134



RECOVERS EDIBLE PRODUCTS FROM FISH SCRAPS

Pacific Fisheries Experimental Station has developed a machine to recover fish material usually regarded as trimming waste. Machine consists of rotary screen drum (10-40 rpm.) in which precooked flesh separates from bone and passes through screen into receptacle underneath drum. Possible uses of recovered fish flesh are loaves, cakes, and canned, smoked, pickled, and spiced products. —Food Ind, Feb, p94

Continuous Emulsification of Rosin Size Now Possible

New process, developed by Hercules Powder Co., makes possible the continuous emulsification of rosin size to supplant batch methods. Advantages are reduced operating costs and space requirements and a greater uniformity in concentration and quality.

Paste rosin size, hot water, and cold water are proportioned by a triplex unit consisting of three pumps and motor. Size first passes through a heat exchanger and then is pumped to an ejector, which mixes it with hot water.

Primary emulsion flows through a turbine mixer, then to a storage tank in which it is diluted to final concentration with cold water. The tank has a float control to start and stop the pump motor as emulsion level varies, thus making the system function automatically.

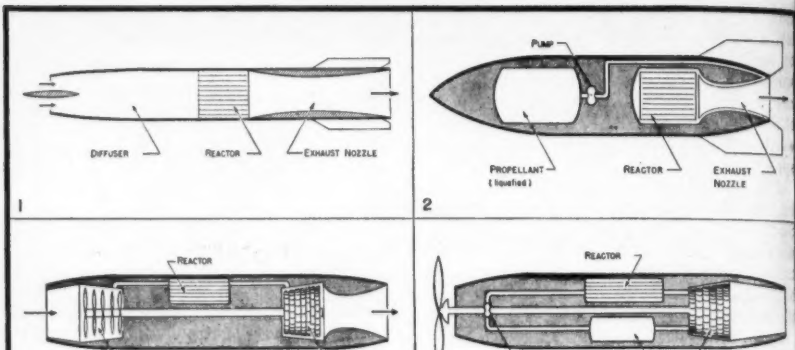
Where size emulsion is added to paper stock at only one point, a variable speed motor can be used to drive the triplex unit. Process is operated continuously at rates controlled by a calibrated rheostat in the machine room. Thus, it also functions to meter the emulsion as well as to prepare it.—Paper Ind & World, Jan, p1453

Largest Offshore Rigs

Two offshore drilling structures, now being built for Superior Oil Co., will be the world's largest. Each will have a deck area of 1 acre, and main platform will be 126 x 172 ft. A 189-ft. derrick, designed to withstand 125-mph. winds and a load capacity of 1.1 million lb., will be erected.—Oil & Gas J, Feb 3, p80

Bendable Wood Paneling

Flexible wood paneling that bends to fit wall conformation has been developed by Kempkes Meubelfabrieken, Waddinxveen, Holland. Panels are 4 x 8 ft., formed of narrow wood laths of birch, beech, oak, or mahogany. Laths are glued at edges to a veneer backing. Panels are available in thicknesses of $\frac{1}{8}$, $\frac{3}{16}$, or $\frac{1}{4}$ in.—Business Wk, Jan 22, p46



NUCLEAR POWER PLANTS proposed for aircraft include (1) ram-jet, (2) rocket, (3) turbojet, and (4) closed-cycle turbine. These and other applications are subjects for . . .

Nuclear Energy at Peace

Developments in nuclear energy will primarily be military in nature but increasing emphasis is being placed on the commercial aspect

MAJOR APPLICATIONS of nuclear energy have been, and in all probability will continue for some time to be, military in nature. But at the same time, work is progressing on adoption of nuclear energy to peacetime applications.

One such application is nuclear-powered aircraft. Several types of nuclear power plants have been proposed for propulsion—ram-jet, rocket, turbo-jet, and closed-cycle turbine.

Simplest is the ram-jet in which air is compressed in the diffuser by forward speed of the plane. Air would then be heated as it flowed through ducts in the reactor, and expand in exhaust nozzle to give thrust. As no known material or combination of materials combines all the thermal and physical properties needed for efficient operation of the ram-jet, it is unlikely that this power plant will soon be developed.

In rocket propulsion, a propellant must be provided. Liquid hydrogen appears t be the only one even remotely feasibl and would have to be carried in suc huge quantities that nuclear-powere rockets seem more impractical at presen than nuclear ram-jets.

But the nuclear turbo-jet appears co siderably more reasonable of attainmen The nuclear reactor would replace th combustion chamber of the chemicall fueled equivalent. Air would be draw into the compressor, forced through th reactor and heated, passed through th turbine for compressor power, and ex panded in the exhaust nozzle for pro pulsion.

Here again the material problem en ters, but it would be far easier to solv than for the ram-jet because of lowe temperatures involved. Nuclear turbo-je planes would operate best at high sub sonic speeds.

The fourth possibility—closed-cycl

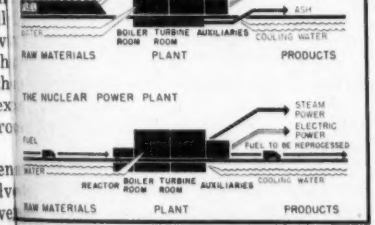
turbine—seems less practical because of low air speeds. But if the condenser were to heat an air stream, as well as the working fluid (steam or mercury), the result would be a prop-jet system. Another possible combination of plants would be turbo-jet and ram-jet for wide speed range.

For naval vessels, nuclear power might be adapted to submarine propulsion. Such a vessel could cruise practically indefinitely, as fuel consumption is extremely small. Oxygen for the crew could be carried in condensed form, so continued submergence would be practical.

A possible plant could consist of a thermal reactor with graphite or beryllium serving as reflector and moderator. Radioactivity would be a problem. Even induced radioactivity in the coolant would require shielding of auxiliary equipment.

Nuclear power plants hold fascinating possibilities—no large fuel storage, no air needed for combustion, no ash, no flue gases. Again, radioactivity would have to be closely watched. But even with nuclear power available, the question of cost enters.

Different estimates have been made in an attempt to compare costs of nuclear power and conventionally produced power. At the present, nuclear power would cost somewhere between 4 and 10 mills per kw.-hr. Therefore, on this basis, nuclear power might be attractive only in certain areas of the world.—Nucleonics, Feb, p2



DVANTAGES of nuclear energy over chem-l energy for power generation include the l job of handling the fuel needed in the nventional plant.

Thin-Shell Arch Roof Poured in Rolling Forms

Rolling forms were used to pour a combined arch and dome roof of concrete, only 3½ in. thick, for a Washington, D. C. skating rink. To provide column-free second-floor rink area, roof was designed as a flat-rise arch 131 ft. wide for the outer 100 ft. and flanked by semi-circular domes.

Structural frame was completed to second-floor level, the slab providing a base for roof framework. For center arch, rolling forms 38 ft. wide were built—pours to be in two 37½-ft. and one 25-ft. widths. Six transverse trusses supporting roof form rode on six wheel-mounted timber towers. When forms were in place for pouring, they were blocked up to distribute load over floor slab. Temporary posts between floors eased the load.—Cons Meth, Feb, p44

Bark Furnace Supplies Steam

Power and steam supply at new Alabama Pulp & Paper Co.'s mill has one feature that differs considerably from similar applications. Power turbines have no 150-psi. steam extraction, despite its demand for pulp cooking and blowing.

Requirements for 150-psi. steam are met by a low-pressure boiler equipped with a bark- and refuse-burning furnace. Thus, it furnishes convenient disposal of refuse. As the boiler does not fill complete steam requirements at peak demands, additional steam is passed from the 400-psi. header through a reducing valve to the 150-psi. header.—Paper Ind & World, Jan, p1471

Carbon-Graphite Parts Demand Design Precautions

Powdered carbon and graphite—mixed with a binder, compacted under high pressures, and baked at 3000° F.—produces a hard, strong, light material. Uses include bearings, seals, packing rings, piston rings, pistons, bearings, seals, and rotary-pump rings.

Shape limitations in design are practically the same as those for powdered metal pressings. Molded tolerances on diameter or cross-sectional dimensions are 1½% of nominal or 0.010 in., whichever is greater. On length, they are 10% of nominal dimension or 0.040 in., whichever is greater. Closer accuracy can be obtained by grinding or lapping.

Certain precautions should be observed on the shape of carbon-graphite parts. Flat pieces should be at least ¼ in. thick, and cylinder walls should be at least $\frac{3}{16}$ in. thick. All slots or keyways should be in the outer wall.

Bearings with high flanges should be avoided by using two pieces—a bushing and an end plate. Sleeves should not be press-fit over shafts, and seals should not be press-fit into a metal retainer.—Prod Eng, Feb, p81

Completely Solar House Built

Glauber's salt stores heat for the first completely solar-heated house built in the U. S. Located in Boston, Mass., the house is believed to be the most northerly solar-house experiment. Sun's rays pass through a double plate-glass window across the front of the two-story house—five living rooms are located on the first floor.

Heat is collected by a copper plate painted black. The plate passes the heat to three heat-storage bins on the first floor where it is stored in cans of Glauber's salt. When heat is needed in the house, fans pass air around cans, picking up heat and crystallizing the salt. Heat passed from attic plate remelts the salt.

Storage bins contain 28 tons of salt costing $240. To keep the house (as salt will do) at a year-round temperature of 70° F. with fuel oil would cost $150 a year, plus furnace investment. House will remain at 70° through 10 sunless days.—Sci Ill, Mar, p28

Airplane Vibration Testing Simulates Flight Vibrations

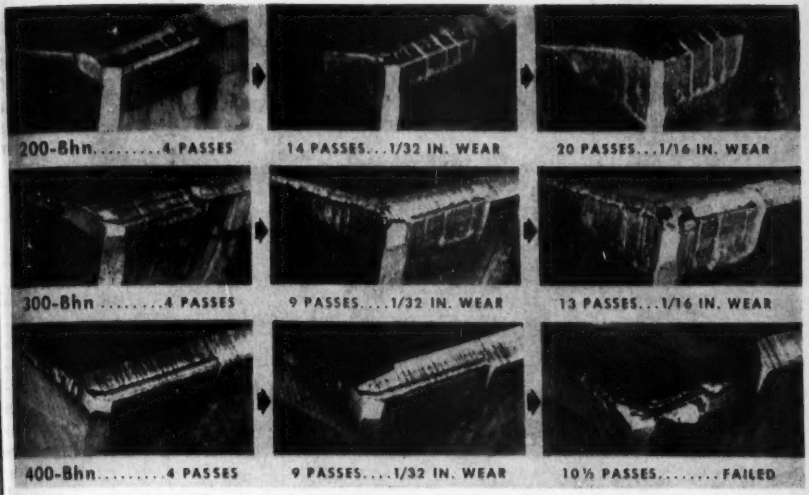
Electronic techniques are well suited to the three general types of vibration testing of airplanes. Fatigue vibration testing establishes comparative lives of materials and components under various frequency and load conditions. Vibration testing of structural components, control surfaces, and controls determines resonant frequencies and amplitudes. Vibration testing of auxiliary equipment determines characteristics under simulated operating conditions.

Simulated vibration conditions in fatigue testing, for instance, can be obtained by actuating a vibrating beam by an electromagnetic transducer. In structural vibration testing, the component such as a wing, is subjected to a sinusoidal force throughout a wide frequency range by one or more electromagnetic vibrators.

The vibrator developed by Boeing Airplane Co. consists of oscillator, driver amplifier, coupling transformer, power amplifier, output transformer, rectifier power supply.—Electronics, Mar, p86

Aids Corrosion Resistance

American Electroplaters' Society reports that research shows porosity of electroplated nickel foil varies with crystalline structure of the deposit. Further research may determine if nickel baths operating under commercial conditions can be modified to give a crystalline structure with improved corrosion resistance.—Steel, Feb 7, p89



PROGRESSIVE WEAR OF CARBIDE BLADES

Tool-life tests were made at Kearney & Trecker Corp. on steels of 200, 300 and 400 Brinell hardness. Test cutters were 3-in. face mills with two tungsten-titanium carbide blades ground to 12° negative radial rake, 0° axial rake, and 15° corner angle. The 200- and 300-Bhn. groups were milled at 430 fpm., 0.125-in. cut depth, and 0.0115-in. feed per tooth. For the 400-Bhn. samples, tool life was practically zero until cutting speed was reduced to 130 fpm. and feed to 0.0045 in.—Am Mach, Feb 10, p98

Self-Contained Power Barge Drills to 15,000 Ft.

Creole Petroleum Co. can now drill oil wells to 15,000-ft. depths in Lake Maracaibo by means of a new self-contained power barge. It is a diesel-electric unit, housing all equipment except draw works, draw-works motor, and rotary-table equipment.

A diesel-electric rig was selected to make the barge house the entire power plant. Steam and steam-electric equipment was undesirable because of the corrosive nature of the boiler feedwater from the lake.

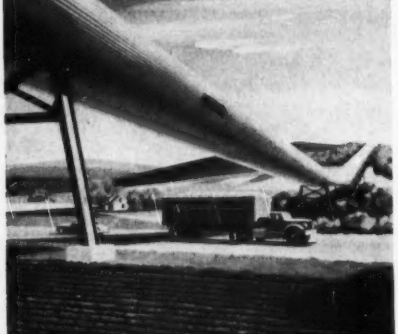
The barge is of the double-end "boiler" type, fitted at one end with retractable mud-cooling coils. It is held in place at the drilling site by four 5,000-lb. anchors.

Prime movers are three 750-hp. constant-speed diesel engines, each connected to a 400-kw. dc. generator, a 75-kw. auxiliary generator, and a 5-kw. exciter. Three 8 x 20-in. mud pumps are used, each with a 4,000-psi. working pressure discharge.—Oil & Gas J, Jan 20, p80

Crash-Proof Radio for Planes

Designed for mounting in the tail of light planes, a 10-lb., crash-resistant radio has been developed. Operating on a frequency of 142,920 kc., it has a transmitting "line of sight" range of 18 mi. On plane's impact, radio begins transmission, sustained for 100 hr. Antenna is held upright by a counter-balance. Unit will float.—Aviation Wk, Jan 24, p25

Outside . . .

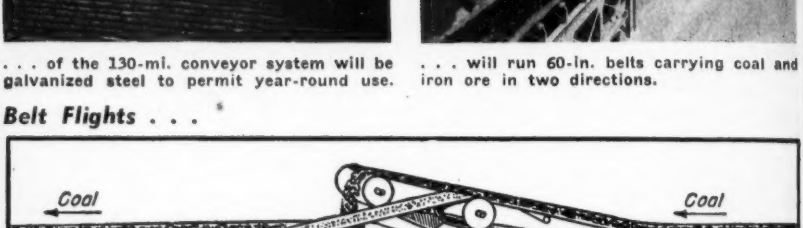


. . . of the 130-mi. conveyor system will be galvanized steel to permit year-round use.

Inside . . .

. . . will run 60-in. belts carrying coal and iron ore in two directions.

Belt Flights . . .



. . . (172 of them) will range in length up to 1 mi., averaging about 3,800 ft. Pneumatic tires at transfer points will take shock of dumping load and reduce coal breakage.

Plan 130-Mile Belt Conveyor

World's longest conveyor to move coal and iron ore on parallel belts housed in galvanized steel; savings over railroad transportation great

COAL AND IRON ORE may be carried across the northeast corner of Ohio by a 130-mi. belt conveyor system, planned jointly by the Akron, Canton & Youngstown Railroad Co., Goodyear Tire & Rubber Co., and Link-Belt Co. The belt would carry coal from the Pittsburgh mining area northwest to the Cleveland area and iron ore southeast from the Lake Erie ports to the steel manufacturing centers around Pittsburgh.

Stumbling blocks still remain, but engineering is proceeding. Right of eminent domain must be obtained from the state of Ohio. This may take 5 years. Actual construction would take at least 3 years.

Capacity of the belt would be 52-

million tons per year—20-million tons of coal and 32-million tons of iron ore. Backers state that with minimum handling of only 15-million tons in each direction the system will save the steel industry $20-million a year. At maximum tonnage possible the annual saving would be $45-million.

System Will Cost $210-Million

The 103-mile straight belt, plus two spurs linking Cleveland and Youngstown to the main line (see map), would cost about $210-millions.

Today, railroads carry this cargo. Saving per ton of ore carried by conveyor instead of by railroads would be about $0.60 per ton; for coal, saving would approach $1.50 per ton.

The belt, 22 ft. in the air, would consist of 172 flights, or belts, none of the flights being at grades greater than 20% although conveyor will cross fairly rough terrain. Longest flight would be 1 mile long; average would be about 3,800 ft. Belts would be enclosed in a galvanized steel housing to permit year-round operation. Housing is to be 18 ft. wide and 8 ft. high. North and south belts would run parallel (see drawing opposite page). A cat-walk would be provided between belts. Pulley system at the end of each flight would permit the belt to be reversed.

Belt rate would be about 6.8 mph. (about 600 fpm.) carrying 3,400 tons of coal per hr. and 5,400 tons of iron ore per hr. Stations along belt would control belt's operation by photocells.

Today conveyor belting lasts through 25- to 40-million tons of materials, up to 100-million tons of fine materials.

Belting would be 60 in. wide except for the belt to Salem which would be 72 in. wide. At transfer points, pneumatic tires would absorb the shock of transferring the load and reduce breakage of coal lumps.

Based on a 300-day year, belt would mean an added load of 925-million kwhr. to the current capacities of local power stations. Additional power plants are planned.

Another problem facing engineers is storage facilities. About $54-million of the total cost of the project would go for coal-washing and coal and iron-ore storage facilities. Coal and ore would be stockpiled at various points along the belt for customer and system convenience.

During winter months, because of frozen lakes, coal shipments from the Mesabi range area of Minnesota are suspended. To keep the belt in year-round operation, large facilities would be necessary at that end. Coal too would be stored during winter months at lake ports for summer lake haulage. With stockpiling facilities provided, turnaround time of lake vessels would be greatly reduced.

Not a New Idea

Long conveyors are not new to American industry. A 10-mi. long conveyor was used during the construction of the Shasta Dam 10 years ago. Goodyear engineers have been working for several years on a plan for a 35-mi. belt to connect Youngstown and the Ohio River. Plans have been abandoned in favor of the longer network.—Business Wk, Feb 12, p45

Conveyor's Course . . .

Technical Shorts

Identifies Tubing—To speed identification of aircraft tubing and insure the logevity of the identification, Glenn L. Martin Co. is using colored cellulose acetate butyrate sleeves sealed onto tubing. Sleeve, 0.025 in. thick and 1 in. wide, is hot-stamped to give manufacturer's part number and flow direction. Color identifies fluid. Sleeves are sealed on tubing with acetone and clamped until dry.—Mod Plastics, Feb, p134

Taps Mains Quickly—Gas and water mains can be tapped quickly by a nipple, developed in Australia. The nipple has milling and tapping edges, so it can drill into a pipe and thread itself in place at the same time.—Power, Jan, p214

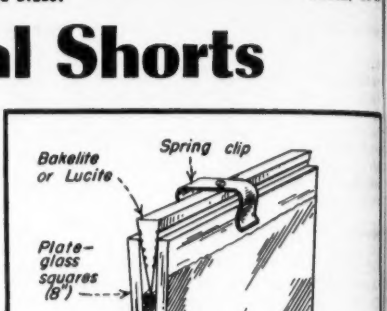
Records Egg Laying—One large chicken breeder is using a wire recorder to keep accurate records of number of eggs laid by each chicken. Hen house is wired with wall plugs connected to recorder. As farm hand gathers eggs, he reads chicken's leg band number into chest microphone plugged into convenient outlet. Permanent records are made from recorded transcription.—Electronics, Feb, p162

Increase Hoist Car Safety—Safety on man-and-supply cars at Elk Creek Coal Co. is increased by a hook-and-pawl arrangement on each car. Hooks on front end ride clear of ties unless slack in hoisting rope drops below minimum. Then hooks drop and dig in between ties.—Coal Age, Feb, p118

Reduces Neps—By bypassing the vertical opener in the opening line, Pepperill Mfg. Co. reduced neps 13%. Avondale Mills obtained fewer neps and had less curling by decreasing vertical-opener speeds from 850 rpm. to 600-700 rpm.—Textile World, Feb, p147

Kirksite Dies Cheaper—General Motors Corp. is building bus bodies of sheet aluminum riveted into monocoque structures. Compound-curved panels are hammer-formed with Kirksite (lead compound) dies—much cheaper than forming with steel dies when output is only a few thousand pieces.—Am Mach, Feb 10, p100

Carries Its Own Water—At Aluminum Co. of America's new rolling mill, aluminum lugs were welded to cables by a portable argon-shielded arc welder. As electrode holder must be water-cooled, contractor mounted welder, a 15-gal. water tank, and an electric pump on a platform truck to supply the cooling water.—Elec C&M, Feb, p99



SHOWS COLOR DEFECTS

This simple device for checking textile printing color for completeness of solution, presence of foreign matter, incorrect strength, or recrystallization can be made in the mill shop. Two square glass sheets, 8 in. sq., are fitted into a spring clip affixed to the base. Wedge is Bakelite or Lucite, notched to take top edges of glass. By applying dye solution to one plate and varying the depth of the wedge, thickness of dye film can be controlled. Once correct film thickness is reached, film can be seen through easily and defects spotted.—Textile World, Feb, p180

Reduces Traffic Accidents—California Highway Dept. is staining highway leadoffs on the Cabrillo Freeway to reduce traffic accidents. Stain seeps into pores of concrete and does not wear off. It gives low glare.—Eng News-Rec, Jan 20, p101

Ladder Safety Hint—Ladder may be tied safely to a pole or other structure from the ground by (1) tying end to one side and top rung, (2) raising ladder to desired point, (3) taking free end of line and walking twice around pole, tossing rope each time so it falls between pole and adjacent side of ladder, (4) pulling rope tightly down ladder face, and (5) tying to lower rung or passing it under rung and tying to pole base.—Elec World, Jan 29, p146

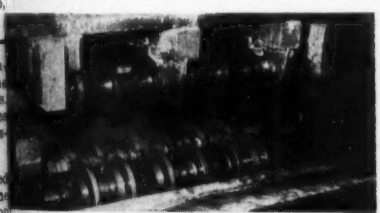
Fire Protection for Ships—*Silverbriar*, new passenger-cargo ship of Silver Line, Ltd., London, will be fitted with dual detection and fire-smothering system in its 680,000-cu. ft. holds. Air is drawn from cargo holds to wheelhouse detector. Ducts bringing sample air to detector also carry CO_2 to holds if smoke is detected.—Marine Engrg & Ship R, Jan, p96

Speeds Materials Handling—A signal board, numbered 1 to 16 to indicate the 16 subdivisions of the Snap-On Tool Corp. plant, has expedited dispatching of materials-handling trucks. Ten-watt bulb lights up behind numeral indicating section needing a truck.—Factory, Feb, p133

Acid Cleans Condensers—At Hotel Statler, Washington, D. C., scale is cleaned from condensers by circulating weak muriatic acid through tubes for about 24 hr. Next, a caustic-soda solution is pumped through tubes for 2 hr. to remove all acid.—Oper Eng, Feb, p49

Bearings Will Not Seize—Chromium-surfaced ball bearings made of SAE 52100 steel will not seize or oxidize in non-lubricated assemblies. Surface has greater density than electroplated chromium and can be applied in thicknesses down to 0.00002 in.—Prod Eng, Feb, p3

Plastic Helicopter Blades—Sikorsky R-5 helicopters will use combination stainless steel and plastic rotor blades during flight tests. Leading edge of wing is 0.030-in. stainless steel. Behind main-spar installation is an 0.007-in. core of laminated phenolic plastic between 0.0015-in. stainless-steel sheet.—Business Wk, Feb 21, p21



CAMSHAFTS SELECTIVE-HARDENED

Pontiac camshafts must have sprocket end relatively soft and cam surfaces hard. Steel cap is placed over end before gas carburizing. After heat treat, shaft is quenched in machine that lowers automatically into solution. Auxiliary fixture at sprocket end directs air against protective cap to avoid any quenching effect.—Steel, Jan 10, p62

Ceramic Coatings—Developed by U. S. National Bureau of Standards to protect molybdenum at high temperatures, ceramic coatings are applied in form of water suspensions by dipping or spraying and are fired at 2150° F. in oxygen-free atmospheres. Typical application is for Pitot tubes built into nozzle end of ram-jet engines.—Steel, Jan 24, p59

Bakes in "Litho" Tins—Just developed is a fruit-cake baking method to do away with baking pans. Cakes are baked in lithographed, gift-type consumer tins, saving time and money.—Food Ind, Feb, p87

Chromizes at 1700-1850° F.—In process developed in England, steel or cast-iron parts are packed in carburizing containers with ferrochromium base material and catalyst. Heating to 1700-1850° F. chromizes parts with chromium penetration depending on carbon content. Corrosion resistance is good.—Iron Age, Jan 27, p65

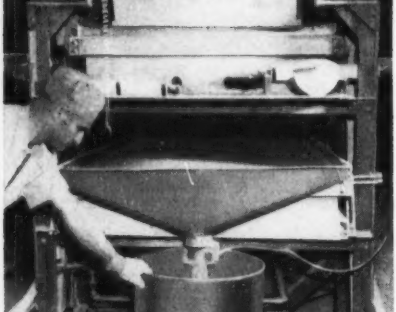
Isolate Anti-anemia Factor—Glaxo Laboratories, Ltd., London, claims to have isolated from liver the anti-pernicious-anemia factor in pure crystalline form. From 1 ton of liver, only a few grains can be extracted.—Chem Eng, Feb, p218

Packaging Machine Lubrication—Centralized automatic or semi-automatic lubrication appears necessary on packaging machinery if advantage of low-cost, mass-production speeds are to be exploited to the maximum. Miles Laboratories has installed a 1-shot semi-automatic lubricating system on its cleaner, filler, and labeler line.—Mod Packaging, Feb, p94

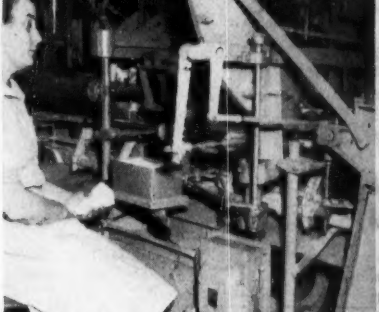
Sands Iced Runways—Twin Cities' Wold-Chamberlain airfield used a Woolery Machine Co. weed-burner to help sand its runways during the winter. Burners covered a 15-ft. wide strip in one pass. Sand was spread ahead of the burner. A 2-in. ice sheet was made usable in only 2 hr.—Aviation Wk, Feb 14, p35

Prevents Line Freezing—U. S. Bureau of Mines, after long research, announced that "freezing" of natural-gas transmission lines is caused by solidification of natural-gas hydrates. Prevention—removal of all water from gas, as hydrates cannot form without water—Oil & Gas J, Jan 27, p359

Iron Melting Costs—Comparison of costs for cupola, electric-furnace, and duplexing melting shows cupola practice cheapest if good coke is available. With inferior or high-priced coke, duplexing with cupola and electric furnace offers practical solution and provides proper metal temperature with continuous pouring.—Foundry, Feb, p78



CONTINUOUS DRYER has pans equipped with vibrators to speed up drying



WRAPPER applies special, self-sealing wrapper over cartons made in packaging machine

Food Mixes Made Continuously

Installing continuous processing equipment and adopting automatic bulk-handling methods expanded production, retained quality

PRODUCTION of prepared food mixes by "Junket" Brand Food Div. of Chr. Hansen's Laboratories, Inc., has been augmented by equipment that makes some operations continuous and allows automatic handling of bulk material.

Operations that have been made continuous are the lines preparing precooked fudge mixes and dessert mixes. On the fudge-mix line, installation of a continuous dryer has resulted in a 25% reduction in drying time.

The dryer is electronically and thermostatically controlled. Pans that make up the dryer are equipped with magnetic-type vibrators. Vibration during drying permits excellent contact of mix with pans so all particles receive equal heating. It also keeps particles of mix in motion, allowing them to dry faster and preventing lumping.

The dryer is in a special room kept at 150° F. First unit on the line is a rotary feed drum into which fudge is fed. Next, the mix travels on three tiers built of a series of hot-air jacketed vibrator pans. Each tier, 65 ft. long, empties onto tier below. A set of rolls after the first pan crushes any large lumps.

Another installation that permits continuous performance is the packaging line. The carton-wrapping operation is outstanding. Several awkward steps have been eliminated by using a self-sealing, laminated-foil wrapper.

No longer is it necessary to chop heat-sealing wax from barrels and feed it to a wrapping-sealing machine. Nor is it now necessary to melt and apply wax to the wrapper.

Throughout the plant, there has been a change to mechanized bulk handling. On the fudge line, a method of metering liquid sugar into cooking kettles is close to a continuous operation.

On the dessert-mix line, sugar is handled in bulk by a conveyor that carries it from storage bins in basement to mixers on the third floor.

Processes also have been improved. A good example is the creaming of the fudge. Previous practice was to remove

...ll fudge particles adhering to the ...reamer.

It was found, however, that these ...rticles did not interfere with quality of ...e next batch. They also speeded up ...gar crystallization by acting as seeds. ...aving them in increased creamer ca...city by 25%.—Food Ind, Feb, p76

Mechanized Bookkeeping Applied to Phone Calls

Another step toward complete mechanization of phone calls was made with the announcement of Automatic Electric Co's installation of its Strowger mechanized toll-call accounting system for Sunland-Tujunga Telephone Co. (see McG-H Digest, Feb, p24). System makes up final bill on call, operators merely changing tape from one machine to another. System works as follows:

As subscriber dials number machine punches a tape. This is fed into another machine to convert punchings into a toll ticket for billing. A third machine makes out the final bill. As number is dialed, electromechanical switches and relays route the call over preferred line or selects an alternative route if direct lines are jammed.—Business Wk, Jan 29, p48

Bailey Bridges as Stringers

Rising construction costs and steel shortages turned the U. S. Forest Service to war-surplus Bailey bridges for stringers in new bridges. Their use resulted in a saving of 50% over standard rolled-steel-stringer spans. Some modification of Baileys was necessary. They were originally designed as narrow through trusses decked with timber.

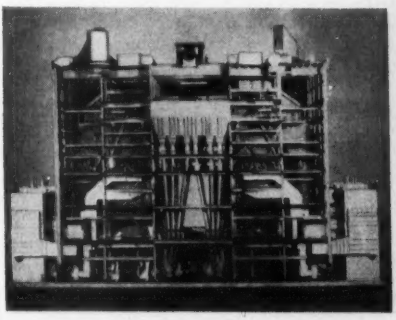
In the new bridges Bailey trusses are used as stringers, spaced equally beneath deck slabs. Enough Baileys are installed to meet H-20 loading requirements. A 60-ft. bridge with a 12-ft. roadway uses six 10-ft. Bailey panels for each of five stringers.—Eng News-Rec, Feb 3, p70

Residual Stresses Change Stabilized-Steel Dimension

Tests by British National Physics Laboratory show that hardened, quenched, and stabilized steel retains considerable residual stresses, despite the stabilizing treatment. A 1-in. dia. and 10-in. long bar of 0.9% carbon tool steel was machined and then hardened by oil quenching from 770° C. Stabilizing was done by holding at 150° C. for 10 hr. and slow furnace cooling.

The bar was then finish-ground, and end faces were lapped parallel. As progressive amounts were subsequently ground off the circumference, length and diameter were measured after each cut. Bar length was found to decrease fairly uniformly with decrease in diameter, but at about twice the rate.

Results indicate: (1) stabilizing did not remove all internal stresses, and (2) dimensional instability presumably is caused mainly by structural changes. —Mach, Feb 5, p1331



POWER-PLANT SCALE MODEL

Construction at Pennsylvania Power & Light Co.'s new station—the world's largest anthracite-burning plant—is guided by a $20,000 three-dimensional model. Built 1/48 actual plant size, it has been invaluable for visualizing clearances and interferences, indicating design changes, and training future operators. Model splits to open in sections, and walls are removable.—Power, Jan, p80

Cathode-Ray Oscillograph Invaluable as Design Tool

Mechanical engineers are finding cathode-ray oscillographs indispensable in solving problems requiring measurement of high frequencies, extreme velocities, dynamic stresses, and similar high-speed quantities.

Deflections from loading machine parts are converted to equivalent electrical impulses by pickups, or transducers. Among these are strain gages, potentiometers, photocells, and snap switches.

A typical example of its use is study of pressure-stroke characteristics of an air ram. Displacement is measured by a potentiometer driven by an endless cable attached to ram. Voltages proportional to changing resistance of potentiometer are impressed on X-axis.

The pressure pickup is a small piston pressing against a leaf spring. Two strain gages on spring form part of Wheatstone Bridge circuit. Gage signal representing pressure exerted on leaf spring is fed to Y-axis.

Result is a reproduced oscillogram that takes the shape of an indicator diagram. Vertical deflection represents pressure, and horizontal deflection the stroke, or displacement.—Prod Eng, Feb, p132

Find Use for Cannery Waste

Food and vegetable canneries may soon have an outlet for disposable trimmings, cores, pods, and shells. Oregon State College has developed a process to convert pear wastes into fuel. Through anaerobic fermentation 1 lb. of waste can be converted into 1.05 cu. ft. of methane gas. The average packing plant produces about 40 tons of pear waste per day, containing about 81,000,000 Btu.

Washington State College has developed a fermentation and distillation unit to produce industrial alcohol from food plant wastes at competitive prices. Waste is ground, sterilized, fermented with yeast, and distilled. Unit handles 50 tons of waste, producing 500 gal. of alcohol; 190-proof alcohol is produced at a cost of 44¢ per gal.—Business Wk, Jan 29, p50

New Oil-Shale Retort Reported Successful

Initial test run of a new continuous-type oil-shale restort has been completed by U. S. Bureau of Mines. Pilot-plant capacity is 25 tons of oil shale per day. Oil recoveries have exceeded the Fischer assay value of 30 gal. per ton of shale.

In the new unit, incoming raw shale is heated by a transverse flow of gas derived from the process. The shale, crushed to small size, passes continuously down between two sets of louvers from which gas is driven through the shale bed. Spent shale is removed from the bottom of the retort.

Indicated advantages are that large tonnages can be handled at a modest construction outlay and the process is self-sustaining. Spent shale will be used for heating the required hot gases.—Power, Jan, p156

Radiant-Heated Highways

Michigan State Highway Dept. tested radiant heating of highways during the winter on 500-ft. strips of bituminous and portland-cement surfaces. Heating element in both strips was an 18-in. wide strip of electrically charged standard sidewalk reinforcing mesh placed 1½ in. below the surface in the normal wheel-track lanes

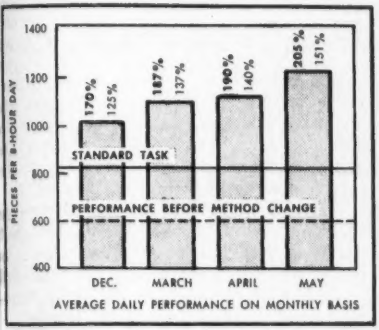
Electrodes were welded to the ends of 98-ft. sections of the reinforcing. Terminals were connected to wiring carried under roadway forms and hooked to underground power lines. Pavement temperature was thermostatically controlled, power turning on at 34° F. and off at 40° F.—Eng News-Rec, Jan 25, p68

Why Not

Make Job Easy

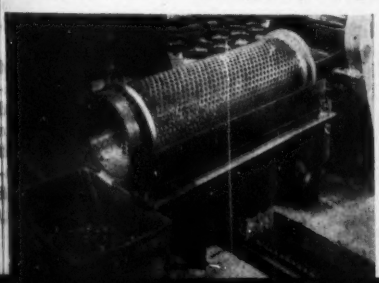
Oliver Iron & Steel Corp. methods program aims for lower production costs. At the same time worker's load is reduced. —Factory, Feb, p80

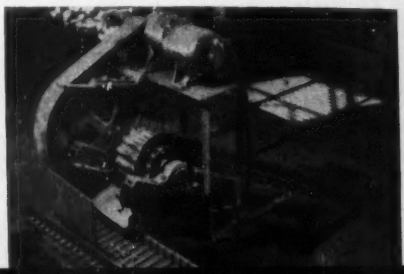
RAILROAD GAGE RODS—35 lb. 6 ft. long—are laid on 4x4 in. lumber and bound 75 to a bundle. Truck carries two bundles. Car loading is cut from 24-8 hr.



GUY CLAMPS are held in simple jig holding bolts upright, plates fitting over bolts, and a pneumatic impact wrench tightening bolts (right). Production is up 151% (light figures above) over standard figure and 205% (dark figures) over former performances.

HOT NUT FORMING peak efficiency has been increased from 36-80% by installation of this sorter. Finished nuts and slugs move from furnace to barrel sorter (below). Slugs fall through and are moved by conveyor (below) to scrap car. Nuts fall to tote pan; move by conveyor to threading operation. No manual handling is now necessary.





Operating Efficiency Key To New Power-Plant Design

Reduction of operating cost was design goal of Pennsylvania Electric Co. for its new Warren power station. Features of the installation show trends in the industry to attain operating efficiency. These are:

1. Automatic equipment and controls, plus low compact building arrangement and central control room, to keep staff at minimum.

2. All-electronic, individually-excited turbogenerator with individual exciter alternators.

3. All-electronic generator voltage regulator and load compensator.

4. Common air supply for high-voltage circuit breakers.

5. Electronic, totally-immersed high-voltage rectification for electronic precipitators installed on all boilers.—Elec World, Jan 15, p79

New in Cigar Packages

Two new cigar packages recently developed are improved as to protection yet retain the "traditional" cigar box look. H. Anton Bock & Co., Inc., is using a metal-topped, humidifying canister of spiral-wound fibreboard. Lined with aluminum foil for moisture retention, outside is wrapped with a cedar veneer for aroma. Metal base is crimped on; close-fitting slip-on metal top assures seal. Canister weighs 9 oz. and costs $.60 compared to $.35 for standard cedar box.

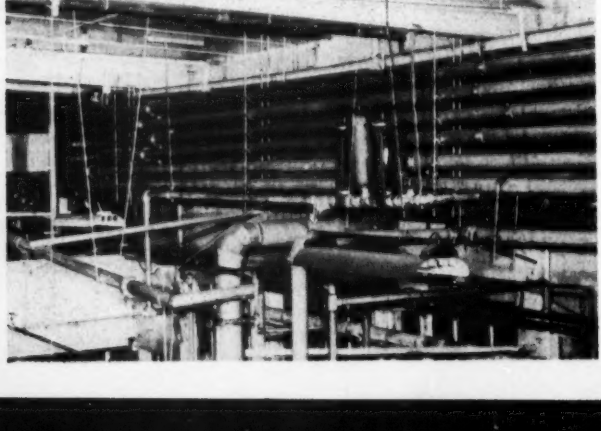
National Cigar Co. is using a folding paperboard carton of standard shape covered with Pliofilm. Board is 0.040 in. thick; finish is white. It weighs about half that of cedar boxes and will withstand 300 lb. without splitting, cracking or losing shape. Closing and sealing time is reduced 50%. Film assures moisture retention.—Mod Packaging, Feb, p92

World's Largest Motor Crane

A welded 45-ton, two-engine motorized crane, said to be the world's largest, has been built by the Thew Shovel Co. for Jones & Laughlin Steel Corp.

The carrier has a welded frame with multiple straight-beam construction. Side members are made of two steel beams, 12 in. deep and 2 in. thick, and are joined together by front bumper and outrigger boxes welded to serve as cross members.

The boom is all-welded with main chord members of high-strength steel. It is 50 ft. long, made up of 25-ft. bottom and top sections.—Weld Eng, Feb, p89



BEAN BLANCHER

In baked-bean processing at J. P. Ritter Co., beans are blanched in a 1,100-ft. tube-type blancher with temperature control and fixed travel time. Blanching medium is water with live steam injected. Water is recirculated with a small make-up replacing losses. Blancher is ceiling suspended to save space.—Food Ind, Feb, p124

kyl Aryl Sulphonates prove Bottle Washing

a conducted by Wahl-Henius Insti- showed satisfactory results in bottle shing are obtainable by use of wetting nts of the alkyl aryl sulphonate group. Other advantages were increase in robial kill, control of algae growth, increase in brilliance of bottles. Also, e formation in washer and rinser was ified in hard-water areas, and bottle els were effectively loosened and hed off.

A concentration as low as 0.15% is ficient to impart excellent wetting and sing properties to a soaker solution of caustic soda. Effect of the wetting nt is to reduce surface tension and duce a free-flowing film that drains othly and uniformly.

Concentrations above 0.25% are uneco- ical. The added depressing effect on face tension is slight. Best results obtained when surface tension is intained below 35 dynes per cm.— od Ind, Feb, p82

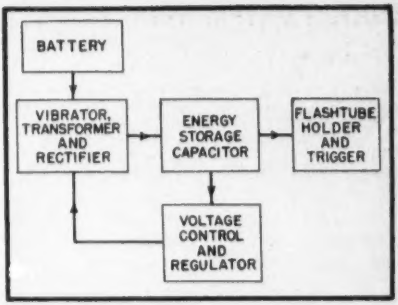
x-Im Bank Seeks Borrowers

e Export-Import Bank ended 1948 ith nearly $1-billion available but un- ned. It was the bank's slackest year nce its inception in 1934; loans totaled ly $138-million (about 25% of the 1947 ital).

Economic Cooperation Administration s eliminated the European borrowers, t other markets, unaffected by ECA, e not using the bank's facilities. Bank cials state that fear of imperialism rs with each dollar borrowed. Na- alistic fervor reduces the desire to rrow. Restriction on remittances of fits prevents American technological wledge from going abroad.

Yet many loans are working out well. ile borrowed $48-million to set up operate its $58-million steel plant Concepcion, Koppers Co. is supply- ing the technical "know-how" to get operation underway by 1950. Loans were made to Brazil to get its steel plant, Volta Redonda, into operation. Currently it is producing close to 250,000 metric tons annually; Brazilians talk of expansion.

Other bank loans have been made to Bolivia for highway construction; to Venezuela and Brazil for power development; to Haiti for agricultural development.—Business Wk, Feb 19, p117



REPEATING FLASH UNIT

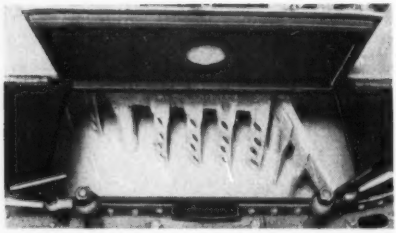
An experimental portable repeating flash unit has been built for photographic flash exposures. Unit consists of four miniature 67½-v. batteries, from which energy is converted into light by vibrator, transformer, rectifier, storage capacitor, and flashtube. Over 800 flashes can be produced from one set of batteries at one-tenth the cost of expendable bulbs.—Electronics, Mar, p74

Detects Faulty Joints

Sources of unusual heat, indicative of faulty joints in overhead power-line conductors, are quickly located with infrared detector developed in laboratories of National Research Council of Canada. Instrument, used like a transit, is optically pointed at line. Temperature differences between conductor and joint are recorded by thermal radiation focused on a bolometer by a parabolic reflector.—Iron Age, Feb 3, p124

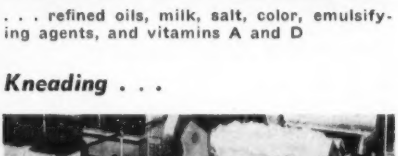
British Margarine Made by . . .

Churning . . .



. . . refined oils, milk, salt, color, emulsifying agents, and vitamins A and D

Kneading . . .



. . . the margarine to right texture by multiplex process of rolling and cutting

and Blending . . .

. . . it in a heavy-duty mixer to desired consistency.—Food Ind, Feb, p69

Filipino Normalcy Returns; Luxury Imports Banned

Economy of the Republic of the Philippines is in danger of returning to pre-war normalcy—an excessively wide gap between the nation's rich and poor. Shops are filled with luxury items at more than normally inflated prices. Imports have been running heavily to high priced cars and other luxuries with little industrial equipment coming in. Less than 10% of total imports have been durable imports.

On Jan. 20 President Quirino banned the importation of luxury items and items produced in the island. At the same time he announced a national development program calling for expenditure of $1-billion by 1952. Aim is to make the islands self-sufficient in food. Over $200-million is for overhaul of transportation and communication; $50-million will go for housing; $220-million will help to rehabilitate the republic's industry, about $33-million going into mines.

About 30% of the country's prewar export income was from ore, gold being a big item. Most mines were knocked out during the war. In addition to gold mines, iron-ore, manganese, chrome, and copper deposits must be rehabilitated.—Business Wk, Jan 29, p85

Grouted Roadbed Saves Repairs

Use of grout under roadbeds of the Great-Northern Railroad has paid for itself in man-hours of maintenance saved plus a profit in ballast saved. Speeds over "slow" sections of track have been increased 10 mph. Fills grouted range from 4-10 ft. deep. Teams completed an average of 1,000 ft. of track per week, each crew operating two grouting units.

One line of grout injectors was driven at ends of every fourth tie and the other driven in along ballast shoulder.—Railway Age, Feb 12, p46

...Auger Undercutter Designed ...or Small Truck Coal Mines

...perated in the W & L Coal Co. truck ...mine since last fall, this low-cost, light-...weight cutter is being manufactured by ...Miller Machine Co. Undercutting is ...done breast fashion, the machine being ...mped straight in, then pulled back and ...moved for the next cycle. It operates ...with a hand tractor.

The 11 augers, 1¼ in. dia., have double-...hardpronged cutting heads 3⅜ in. dia. Heads ...have removable Kennametal inserts. ...Alternate augers rotate in opposite di-...rections. Making a 3½-in. kerf takes 2 ...thin., the cut being 26 in. wide and 54 in. ...deep. Machine, powered by a 3-hp., ...220/220-volt, single-phase motor, moves ...forward through a 3-speed gear reducer.

...Undercutting and consequent shooting ...result in coarser coal. Elimination ...shooting increases safety.—Coal Age, ...p99

...akes Steel Temperature

...photoelectric bath pyrometer for ...measuring temperature of molten steel ...has been developed by Brown Instrument ...Co. A 7-ft. sighting tube is immersed in ...the metal, and compressed air is forced ...through an opening in the end of the ...tube to form a pocket in the metal.

A phototube is mounted in the other end of the sighting tube. Temperatures are recorded on a dial-type chart.

To make a reading, the operator pushes the immersion tube into the slag until a protective coating is formed on the tube end. The tube is then pushed about 6 in. into the molten steel, and the operating pushbutton depressed for several seconds until the indicator pointer comes to rest.

Advantages claimed for the instrument are high accuracy, low operating and maintenance costs, and improved ingot quality from better control of refining temperatures.—Electronics, Feb, p152

Zoned Air Conditioning

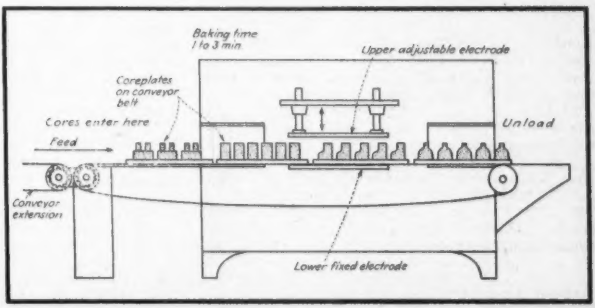
Woodside Cotton mills has installed a zoned weave-room air-conditioning system which uses no steam in either summer or winter. Windows of the plant were bricked up, but no other insulation was necessary. Mill converts cotton to staple yarn.

Control is accomplished with a wet-bulb converter instead of the conventional dew-point control. Weave room is divided into four zones, each served by an aspirating cabinet containing the wet- and dry-bulb recorders. On evaporating-cooling cycle, wet bulb positions both outside and return-air dampers. This protects against sudden changes in room conditions because of rapid outdoor climatic shifts.—Textile World, Feb, p135

...epai...

...CORE BAKER

...rompton & Knowles ...om Works supple-...ents older baking ...ns by electronic ...t made by Induc-...n Heating Corp. ...McG-H Digest, ...'48, p47). Cores ...Maranite trays ...el on wire belt ...tween two elec-...des and dry in 2 ...Superior cores ...obtained at low ...cost.—Iron Age, ...3, p116



New Products

Heavy Reel Dispensing Rack—Two rollers mounted in a heavy steel frame facilitates unrolling of heavy cable reels. Front ramp makes positioning of reel easy. Back roller is adjustable for reels up to widths of 30 in. Thumb screw locks roller during placement of reel on frame. It is a M. A. Austin Co. development.—Factory, Feb, p174

Unpacks and Dumps Cases—Edward Ermold Co.'s automatic machine removes standard containers from cartons, cases, or trays. It also discharges containers onto continuous conveyor in multiple rows. Speed is 4-15 cycles per min.—Food Ind, Feb, p174

Paper Die Cutting Press—Hydraulically operated 60-in. die cutting press is offered by Standard Machinery Co. Intended for manufacture of paper products, press is 34x60 in. and operates at 15 strokes per min.—Paper Ind & World, Jan, p1536

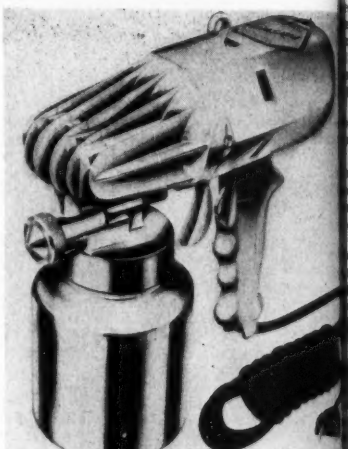
Lubricant Resists Fire—Pressure-transfer medium known as Skydrol and made by Monsanto Chemical Co. does not feed fire as do ordinary oils. Fluid operates with pressures up to 5,000 psi. with negligible loss in film strength. Viscosity index is 160, and pour point below –60°F.—Prod Eng, Feb, p170

Easy-to-read Altimeter—Second pointer is eliminated and a 2-digit counter substituted in Kollsman Instrument's new altimeter. Counter indicates thousands of feet.—Aviation Wk, Jan 31, p14

Lightweight Gas Engine—Weighing only 30 lb., Reed-Prentice Corp.'s air-cooled 2-cycle gasoline engine has die-cast aluminum parts. Developing 4 bhp., it is intended for application to portable generators, saws, compressors, conveyors, and similar equipment.—Power, Jan, p182

Controls Motor Load—Electronic load controller, Flexi-Trol, is for use on motors in processing equipment. Device controls material feed to equipment. If overload occurs, unit initiates time delay, thus shutting down the feeding motors. G. C. Wilson & Co. developed the controller.—Prod Eng, Feb, p162

New Top-dyeing Machine—Uniform dye top results without need for recombing after dyeing with William Allen Sons' top-dyeing machine. Fiber is undisturbed. The dyeing cycle can be operated either manually or automatically, machine being available in 150-, 300-, 450-, 600-, and 750-lb. capacities.—Textile World, Feb, p162



PORTABLE PAINT SPRAYER

Quart paint container and compressor are integral part of this portable sprayer designed by Selco Corp. Motor operates on either ac. or dc. 110-v. outlet, produces 50-psi. pressure. Fan or cone nozzles available. Pistol grip, trigger control, and balance make the 4-lb. unit easy to handle.—Ind Dist, Feb, p130

Adjusts Grinder Table—Brown & Sharpe Co. has developed the Electralign for electronic alignment of grinding-machine work tables. By making measurements with standard gages, it detects displacements of 0.0001 in. and amplifies them to show on indicating scale.—Am Mach, Feb 10, p141

Unit Heater—Self-contained, gas-fired, revolving unit heater is designed for overhead location. Offered by L. J. Wing Mfg. Co., it projects warm air in all directions to working level.—Oper Eng, Feb, p66

Power Plane—Stanley Tools' electric wood plane has patented spiral cutter which produces smooth waveless surface. By substituting cutters, it can make surface beads, tongue and groove, and other molding cuts.—Am Builder, Feb, p113

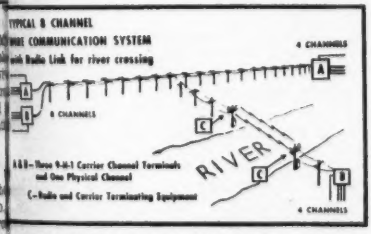
...od, Resin Insulator—Of mineral wool and ...in binders, a new low-temperature insula... ...—Zerolite—has a designed temperature ...ge of −400° to 250° F. It is marketed as ...et, lagging, and pipe insulation. In tests it ...orbed no water after 96 hr. at 75% relative ...midity; it has a heat conductivity value of ...8 at 70° F. It is a Johns-Manville Sales ...p. development.—Business Wk, Jan 22, ...

...rtical Diesel Engine—Nordberg Mfg. Co. ... announced type 4FS-1 diesel engine. It ... a vertical, 4-cycle, single-cylinder, me...anical-injection engine with 4½-in. bore ...d 5¼-in. stroke. Rating is 10 hp. at 1,200 ...m. and 15 hp. at 1,800 rpm.—Oil & Gas J, ...b 3, p97

...tting Agent for Textile Industry—Santo...rse 30-X is synthetic detergent recom...nded by Monsanto Chemical Co. for wet ...ocessing of textiles. It contains 30% solids ... which 85% is alkyl aryl sulphonate and ...% sodium sulphate.—Chem Eng, Feb, p184

...uring Ladle Truck—Developed by Yale & ...wne Mfg. Co., ladle truck of 6,000-lb. metal ...pacity has refractory-brick-lined ladle ...ounted on skid engaged by truck platform. ...l movements, including door operation and ...uring, are controlled by operator.—...oundry, Feb, p270

...lf-deicing Hydrant—Water can remain in ...e Crane Co.'s new hydrant above frost line ... winter and when valve is opened, water ...ns freely. Rubber tube placed under ten...n inside riser runs entire length above ...ost line. When pressure on tube expands ...gainst inside of riser spout, water flows ...round ice breaking it up—Railway Engrg ... Maint, Feb, p159



MICROWAVE TELEPHONE LINK

...telink, offered by Federal Telephone & ...adio Corp., transmits more than seven two-...ay conversations at one time. It can be ...ed as part of long-line telephone systems ... span rough terrain or complete point-to-...oint communication.—Oil & Gas J, Jan 20, ...99

Vertical Injection Molder—Lester-Phoenix, Inc., has developed a 48-oz. injection mo...ding machine for plastics. Stationary die is 29½x40 in.; moveable die is 29½x34 in.; vertical height is 3 in. maximum. Cylindrical compensating feeder fills injection cylinder at each shot in exact proportion to previous shot. —Mod Plastics, Feb, p130

For Heavy Cutting—Linde Air Products Co.'s Oxweld C-60 torch is designed for heavy cutting, such as scrap cutting of skulls and buttons at steel mills. A mixer-type torch, it has no valves and can cut steel over 6 ft. thick. —Weld Eng, Feb, p75

Vacuum Lawnmower—Fan-end blades of National Metals Product's new lawnmower create a vacuum to pull flat-lying grass up to its rotary cutting blade. Suction also scatters cut grass instead of leaving it in windrows. It cuts a 20-in. swath. Gasoline motor develops 2 hp.—Hardware Age, Jan 27, p126

Records Smoke Density—Bailey Meter Co.s new smoke-density recorder consists of light source, bolometer, and electronic recorder. Changes in the bolometer filament temperature causes potentiometer unbalance which positions the recording pen.—Electronics, Feb, p197

Sealed Photocell—Weston Electrical Instrument Co. is offering Model 856 sealed Photronic photocell for use under conditions of continued high ambient humidity. It has a helium-filled case, and metalized glass cover soldered to case. Cell is available with three types of windows—clear glass, visual-correction filter, and heat-absorbing filter.—Elec World, Jan 29, p170

Analyses Metals—J. W. Dice Co.'s model C Cyclograph is a portable instrument designed for metallurgical examination and sorting of metal parts. It operates on core loss principle. Test frequencies are 2-200 kc.—Iron Age, Jan 30, p73

Vertical Centrifugal Pump — Designed for high-pressure, low-volume pumping, a vertical centrifugal pump has a capacity range from 10-140 gpm. and head range of 450-1,700 ft. It is operated by a standard 220-440-v. motor. It is a Byron Jackson Co. development.—Eng News-Rec, Feb 3, p84

Joint for Lined Pipe—Pipe joint for installation or repair of rubber-lined pipe can cut time 50%, joints being completed in 2 min. Pipe is cut, grooved, bored, and counterbored by special machine, then rubber inserts are placed and flanges bolted together. Joints are available for ½- to 4-in. pipe in 45°'s, L's, T's, Y's and separator flanges for straight lengths. Joints were developed by Gates Engineering Co.—Eng & Min J, Feb, p138

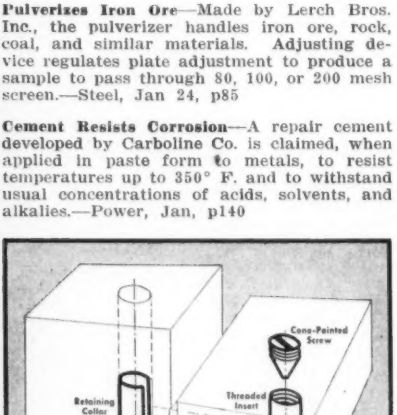
New Products (Cont.)

Vinyon-N Filter Cloth—Vinyon-N, because of its heat, alkali, acid, and bacterial resistance and non-binding quality, is being used for filter cloth, developed by Filtration Engineers, Inc. The cloths can be used in all types of filters, including rotary type.—Eng & Min J, Feb, p134

Air-jet Chipping Hammer—Chicago Pneumatic Tool Co.'s new small chipping hammer has an air jet to clean off work surface. Tool weighs 4 lb. and is 10 in. long.—Oper Eng, Feb, p78

Pulverizes Iron Ore—Made by Lerch Bros. Inc., the pulverizer handles iron ore, rock, coal, and similar materials. Adjusting device regulates plate adjustment to produce a sample to pass through 80, 100, or 200 mesh screen.—Steel, Jan 24, p85

Cement Resists Corrosion—A repair cement developed by Carboline Co. is claimed, when applied in paste form to metals, to resist temperatures up to 350° F. and to withstand usual concentrations of acids, solvents, and alkalies.—Power, Jan, p140



MECHANICAL FURNITURE JOINT

Woodscrews and glue are unnecessary in furniture assembly with this mechanical joint developed by Western Automatic Machine Screw Co. Furniture can be shipped knocked down and assembled on the floor with a screwdriver. Locking pin is held in place by retaining collar. Other end of pin fits into drilled hole in mating piece, fitting slightly off center and producing a tight fit as it is tightened. Joints will work in stock ½-8 in. thick.—Business Wk, Feb 5, p44

Sprayable Masonry Coating—Available in white and 12 shades of red, yellow, and green, a new plastic wall covering gives good texture finish for monolithic concrete, brick, or block walls. The hydraulic setting material is shipped in two parts, liquid binder of synthetic rubber and a powdered plastic material and asbestos fiber being mixed at site. It is spray-applied. Minnesota Mining & Mfg. Co. developed it.—Cons Meth, Feb, p107

Neoprene-coated Cable—Featuring neoprene covering bonded to metal, Flexpansion electrical conduit is made by Techniflex Corp. Industrial applications include wiring for machine tools, chemical plants, and paper mills, and underground conduit for public utilities.—Elec C&M, Feb, p108

Tilt-type Hand Truck—Lightweight, battery-powered single-lift and telescopic hand trucks have been announced by Automatic Transportation Co., both units having hydraulic lift motor and pump. Single-lift unit weighs 3,400 lb.; telescopic unit weighs 4,000. Both operate from 11-plate battery; both tilt 21° backward, 5° forward.—Factory, Feb, p144

Fortifies Milk—Continuous fortifying with vitamin D is possible with Proportioneers Inc.'s new Vit-O-Feeder. It injects vitamin into milk through a capillary needle from which concentrate is "wiped" by flow of milk.—Food Ind, Feb, p174

Cuts Pipe Square—Smooth bevel and square cutoff on pipe are produced by torch attachment for pipe dia. of 3-36 in. Developed by Kinmont Mfg. Co., Inc., the power unit features a chain drive to hold and turn pipe.—Weld Eng, Feb, p72

Quick Masonry Scaffold—An all-steel mason's scaffold jack that can be set up in 1 min. has been designed by Wilson-Albrecht Co. Inc. Jack legs can be adjusted for sloping land. Jacks can be set at 4-in. steps from 4-6¾ ft. in height. They weigh 38-49 lb.—Business Wk, Feb 5, p46

Triple Analyzer—The Nefluoro—Photometer, offered by Fisher Scientific Co., is an electronic device for nephelometric, fluorometric, and colorimetric analyses. Incandescent, mercury and sodium light sources are available for various analyses.—Electronics, Feb, p209

Portable Sheet Cutter—Circular cuts of only 1-in. radii can be made in 20-gage metal with a new portable sheet-metal cutter. Metal is not burred, bent, or stretched. Cutter can be fitted into the chuck of a standard ¼-in. hand-operated tool. It can be used on plastics. Nord International Corp. developed the 13-oz. tool.—Aviation Wk, Feb 14, p27

Tacker Doubles Output—A new tacking machine, developed by Backman Uxbridge Worsted Co., doubles per hr. production and reduces labor costs. Hand feeding is eliminated, the machine taking varied width pieces into the sewing head. Other benefits: it operates at double standard speeds; selvages are never lapped over.—Textile World, Feb, p159

Thaws Coal Cars—A portable coal-car thawer, designed by Hauck Mfg. Co., is said to thaw a frozen 2-hopper car in ½-¾ hr. sufficiently for dumping. Perforated steel tubes are placed directly under hoppers. Smokeless heating flame covers entire width of hopper.—Coal Age, Feb, p180

Bores Large Pieces—Designed for rough boring railroad car wheels and similar large pieces, the vertical boring machine is offered by Snyder Tool & Engrg. Co. A similar machine is available for finish boring. Tool speeds range from 80 to 240 rpm. Feed speeds are infinite, and the stroke is 14 in.—Am Mach, Feb 10, p146

Make Soap from Coffee—Coffette Products removes tannin and albumen from coffee beans to produce soap and soap powder. Oils extracted are treated with an alkali. All oils cannot be extracted but those remaining have a softening effect upon the water.—Business Wk, Feb 19, p58

Explosion-proof Floor Machine—Developed by Multi-Clean Products, Inc., the unit is intended specifically for floor maintenance in petroleum refineries and in chemical and munitions plants where sparks are dangerous. It is for scrubbing, cleaning, and polishing.—Oil & Gas J, Jan 20, p100

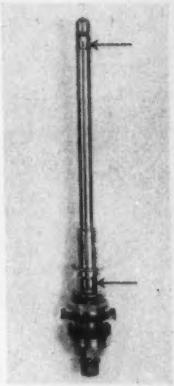
Conveys Powdered Materials—Dustless conveying is possible with AirBorne Conveyor Corp.'s pneumatic conveyor. A centrifugal separator used with conveyor recovers fine particles. One test on wheat flour having 30-40% of its particles in the 15-25 micron range showed no measurable loss.—Chem Eng, Feb, p158

Interrupts Circuit—For use where space is limited and local disconnect is necessary, circuit interrupters in cast-iron enclosures are made by Square D Co. They are identical to corresponding circuit breakers, except that they have no thermal or magnetic trip features.—Elec World, Jan 22, p29

Steam Tempering Furnace—Leeds & Northrup Co. has introduced a steam homo-temperizing furnace designed for scale-free tempering and strain relief. Steam, fed into work chamber through a bottom inlet, permits turning out steel parts with uniform blue oxide finish.—Foundry, Feb, p266

NEW LONG-LIFE TEXTILE SPINDLE

Power saving of 25-50% are possible with this Saco-Lowell Shops' spindle and life of spinning tapes is increased 300% with better quality resulting. Blade is replaced by a tube revolving on two ball bearings (arrows). Bearings need be oiled only every third year.—Textile World, Feb, p160



Heats Forging Billets—Ajax Electrothermic Co.'s new induction heater delivers 2½x-3 5/16-in. steel blanks at 2200° F. every 4.8 sec. to forging machine. Blanks are chute fed at receiving end and pushed into heating coil by automatic pusher. Power source is 700-kw., 960-cycle motor-generator.—Iron Age, Feb 10, p84

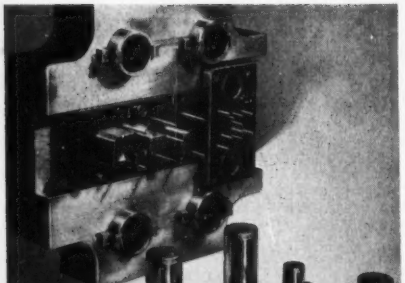
Dust-free Masonry Saw—Dust-free, dry-cut masonry saw, developed by Martin Fireproofing Corp., eliminates dust with a vacuum dust collector which filters air through a special bag. Both saw and dust collector are powered by a 1½-hp. motor.—Eng News-Rec, Feb 3, p86

Refrigerator-stove Combination—General Air Conditioning Corp. has developed a one-piece stove-refrigerator combination requiring only 27½x21½ in. of floor space. Refrigerator is 4 cu. ft. Stoves are available as 4-burner gas units or 2-plate electric units.—Business Wk, Feb 19, p60

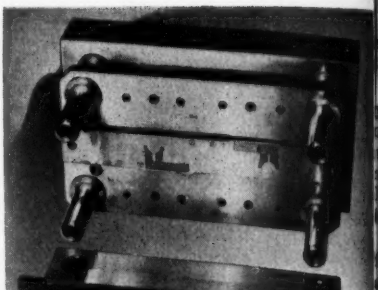
Magnetic Motor Starter—Trumbull Electric Mfg. Co.'s unit protects ac. motors up to 50 hp., 440 v. Bimetallic relay heaters follow heating curve of motor, and a plastic-encased coil gives protection from moisture, corrosion, and abrasion.—Elec C&M, Feb, p105

FREE SERVICE TO READERS

As a special service to our subscribers, McGraw-Hill Digest will furnish, without any charge, additional information about any new product or technical development described. Address your letter to: The Editor, the McGraw-Hill Digest 330 West 42nd St., New York 18, N. Y., U. S. A.



LAMINATION DIE for electric shavers is carbide with expected life of 375-million hits



PROGRESSIVE DIE finishes two laminations per stroke; press runs at 340 strokes per min

Carbide Dies Set Records

Millions of hits between grinds is not uncommon with carbide die sets; life expectancies 20 to 60 times those of steel die

CARBIDE DIES for sheet-metal press work are no longer experimental, and no major difficulties are encountered in their application. But for economy of performance, a number of deviations from customary practice with steel dies are desirable. These include:

1. Carbide-die cost could be reduced if some safeguards now necessary in construction because of press limitations could be eliminated. Average cost is three to five times that of a comparable steel die; die life is 20 to 60 times greater.

2. Die life is longest at high ram velocities. Limiting factor is maximum feed speed.

3. Long life requires periodic inspection of press equipment to prevent breakdowns while the die is still in good condition.

4. Average die should be run until a regrind of 0.004-0.006 in. is needed. This compares to 0.010 in. for steel dies. Thus, in stamping motor laminations changing dies when burr height becomes objectionable is not good practice, because carbide dies do not round over and excessive wear may result in chipping of edges.

5. Wear on carbide punches ranges about 50% above that for mating dies. Sharpening may require removal of 0.000 in., as compared to 0.004 in. for the die.

6. In stamping parts with continuous feed, care should be taken to avoid loading up of slugs.

7. When carbide dies are to be used sharp corners should be replaced by small radii.

8. When punches are replaced before die, the new punches should be made slightly larger than the original ones to compensate for back taper in the re ground die:

Typical carbide die sets are shown in illustrations. These were made of ...boloy by Lincoln Park Industries.

On the left is a progressive die used ...Schick, Inc., to produce laminations ...r electric shavers. Laminations are ...ched from 0.014-in. silicon-steel strip ...four stations of the five-station die. ...d in a 25-ton Henry & Wright press, ...die is still running after 1 year.

...l is sharpened by grinding 0.004 in. ...f die and 0.006 in. off punches after ...ch 3-million hits. This gives the die a ...e expectancy of about 125 grinds, or ...-million hits. On the same job, steel ...s, costing one-third as much, produce ...,000 hits per sharpening and about ...0 in. is removed each time.

The die on the right is a four-station ...gressive die used by Telechron, Inc. ...a No. 645 Bliss press to stamp lam...ations for electric-clock motors. Two ...ces are perforated and blanked at the ...e time from 0.031-in. mild silicon ...el.

...arbide ...Performance was 11-million hits on ...r grinds. Economical average of ...l die...illion hits per grind compares with ...0,000 for steel dies.

dies ...An interesting feature is the thin ...ations...gue of carbine projecting into the die ...come...ity. When the die was designed, some ...e, be...cern was felt that it might not stand ...er and...as it has no side support. But during ...ing a...eding-mechanism jam when the strip ...l improperly into the die, no damage ...range...caused, despite the severe unbal...g dies...d load on the tongue.—Am Mach, ...f 0.00...10, p85 ...he die.

...tinuou... ...d load...

...etalworking Shorts

...fiber-glass washing-machine tub has ...e use...n developed by an appliance manufac...ced b...er. Made in a metal die, tub can be ...nted any desired color or a color pig...befor...t can be put in the plastic. It can...e mad...be dented and can be made at a lower ...ones ...than a metal die.

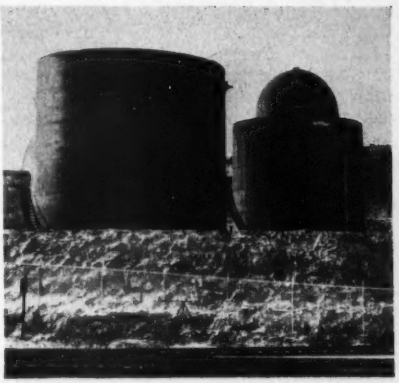
...the re...carburizing, cost increases as case ...h increases. But, in induction hard...ening, a shallow case costs more than a greater one because it requires shorter-time higher current or higher frequency.

Largest electric resistance welding pipe-making machine, built by Yoder Co. for Argentina, can make 5- to 16-in. pipe at 15-60 fpm.

Furnace temperatures are going up. An electric furnace is now being built that will give temperatures as high as 4000-5000° F. It is intended for special government research work.—Am Mach, Feb 10, p79, 100, 125

Pressure-Sensitive Tape

Strong enough to compete with metal strapping for heavy-duty packaging, a pressure-sensitive industrial tape, developed by Minnesota Mining & Mfg. Co., has tensile strength of 180 lb. per in. of width. Tape has a paper backing with thread-like fibers running its length. No equipment is required to apply it. It can be used to bundle pipe, conduit, sheet, coil, etc.—Mod Packaging, Feb, p136



RECOVERS GASOLINE VAPORS

Socony-Vacuum Oil Co., Inc., is recovering gasoline vapors with these dome-shaped storage tanks. Dome contains a nylon diaphragm coated with Pubunan rubber. Rising vapors expand diaphragm. As pressure drops in tank, vapors condense to gasoline.—Business Wk, Jan 22, p70

SIDE A - FRONT OF CARD

JOB MIN. 350 MAX. 1000

VENDOR	VENDOR	VENDOR
COMPANY X	COMPANY Y	COMPANY Z
TERMS FOB	TERMS FOB	TERMS FOB
ATTEN. Mr Westley	ATTEN. Tom Norton	ATTEN. Mr. Jones

DATE	B.	P. O. #	VEN.	CODE	MAKE	QUAN.	PRICE	DEL'Y SCHEDULE
9/23/47	2	B74092	1	21	X	1000	1/100 EA. 30%	AT ONCE
10/1/47	2	D-763	2	21	Y	504	1/100 EA. 30%	OUR PICKUP 10/2

ITEM FLUORESCENT TUBES, 40W-48" F-1-40-T-12W # 4500 WHITE

MAINTENANCE PARTS CONTROLLED BY ONE CARD

Jack & Heintz Precision Industries, Inc., has adapted this one card for its control of maintenance parts, tools, and factory supplies. Paperwork has been reduced. Card serves both as a requisition form and inventory control card. Side A carries vendor in[formation]

Hints on Saving Water in Food Canneries

Many economies in the use of water are possible in canneries. Among them are means of conveying food and waste other than by fluming, replacement of low-pressure sprays by high-pressure sprays, and avoidance of unnecessary water overflow from equipment.

In food washing, when two successive cold-water immersion washings are made, water from the second may be used for the first if it is not too heavily contaminated with organic matter or insects. Water from can coolers may safely be used in immersion washers followed by spray washers. No warm wash water should be reused.

Recovered can-cooling water also may be used in flumes for conveying and washing raw unprepared produce, but not for partially prepared products or in blanchers. Water from blanchers should be used only for fluming wastes.

If water from can coolers is reused in the same equipment, it should be screened, cooled, and chlorinated to ke[ep] the bacterial count below 100 per ml. A chlorine residual of 0.5-1 ppm. should be sufficient.—Food Ind, Feb, pW11

Checking Cylinder Bores

Air-gaging equipment checks cylinder bores of the new Oldsmobile V-8 engine and stamps the proper size designation alongside the bore. The cylinder block rolls from conveyor line to gage where it moves into position on a turntable and is locked by hydraulically actuated pins.

The operator then lowers the four gaging spindles into bores by pushbutton control. Each spindle has four sets of air jets to give four separate diameter checks along each bore. Glass tubes in cabinet face carry floats, the height of which shows diameter at check points.

Charts behind tubes are graduated and lettered with eight letters. If bores are correct, floats average out to one letter and the operator sets stamping tool for that letter and allows it to drop on the block, imprinting the letter thereon.—Steel, Jan 24, p56

DE B • BACK OF CARD

DATE ENTERED	ORDER NO.	QUANTITY IN	QUANTITY OUT	AVAILABLE IN STOCK	DATE ENTERED	ORDER NO	QUANTITY IN	QUANTITY OUT	AVAILABLE IN STOCK
11/21/7	7-534		144	856	12/23/7	D-3541	OK Les		2000 ✓
11/28/7	INVENTORY			695	12/19/7	5-534		712	—
11/28/7	5-534		48	647	1/7/48	D-2725	990		990
12/8/7	D-2725	OK Les		1000 ✓	1/12/8	5-534		434	556
12/5/7	5-534		647	—	1/20/48	D-4407	OK Les		1000 ✓
12/9/7	D-1953	1000		1000					
12/9/7	5-534		288	712					

ITEM FLUORESCENT TUBES, 40W-48" F-1-40-T-12/W #4500 LOCATION 5-538E **0 1542**

...tion and minimum-and-maximum order ...antities. Chronology of purchases is be-... Side B lists dates and amount of stock ...ement. Clerk types in the "available in stock" figures in red. When stock must be ordered, card is routed to buyer; buyer places order, makes notation on Side A, and returns card.—Factory, Feb, p77

...ew Wool Opening Machine ...uts Preparation Costs 25%

...pening time of wool bales has been cut ...% and workers' load reduced one-third ... East Weymouth Wool Scouring Co. ...th installation of three new prepara... machines. Manual handling is ...minated; fibers are not broken or ...dermis damaged in opening; fibers are ...livered to scouring range in a more... ...less carded condition; no grease is ...moved from the fiber.

...eed hopper serves as storage and ...ding bin, and empties onto the first ...tion of the opener. One doffer with ...acting teeth, one 36-in. dia. cylinder, ...worker, and two strippers—one with ...acting-pin beater—comprise the first ...ning section. Second has two workers ...one stripper. Pins in second section ...finer than in the first. Second sec... empties onto scale.

...carding process, waste decreased ...mechanical opening and there was ...spoilage, the fibers being more uni... ...and staple length increased from ...in. Resulting yarn strength was up 25%, requiring less twist for the same strength.

In machines with 4-ft. opening units, 4,000–5,000 lb. per hr. can be produced. With 6-ft. wide units, output is increased to 7,000–8,000 lb. per hr.—Textile World, Feb, p118

Drills Oil Well at 57°

An unusual high-angle directional drilling job is being carried on by Magnolia Petroleum in the Gulf of Mexico. Noteworthy features include:

1. Securing abnormally high "drift/depth ratio" (1.58) by drilling with high angles, up to 57½°, established at shallow depths.

2. Accomplishing two high-angle side-tracking operations, deflecting toward high side of hole and combining side-tracking with increase in drift angle.

3. Use of Homco deflecting bit, oriented to change drift angle or direction without pulling from hole. This facilitates directing the hole toward its objective with little delay in drilling and reduces number of round trips.—Oil & Gas J, F b 3, p60

Refines Aluminum Grain

An investigation, sponsored by U. S. Office of Naval Research, has been conducted to determine how grain size of cast aluminum can be controlled. As aluminum alloys undergo no phase change in the solid state, grain refinement must be effected in the melt.

Commercially pure aluminum has an extremely coarse grain when slowly cooled from the liquid state. Reasons are that few nuclei are present in the molten metal, few are formed on slow cooling, crystal-growth velocity is not lowered by impurities present, and slow cooling gives time for grain growth.

Addition of small amounts of refractory metals—titanium, tungsten, zirconium, boron, and other—produces a fine grain because of the large number of nuclei formed.

Other metals, such as magnesium, copper, zinc, iron, and nickel, refine grain also. Refinement is presumably accomplished by alteration of certain physical characteristics of the melt, such as viscosity, surface tension, and diffusibili This alteration, in turn, appears to crease silghtly the number of nuclei to slow the crystallization velocity.—In Age, Jan 20, p66

SPEEDS GUTTER PAVING

This special extension form bolted to end of grading blade eliminates hand shoveling, spreading, and tamping of hot asphalt mix to form roadside gutters. Hot mix is dumped in windrow ahead of grader near road edge. Blade moves mix to gutter and special form forms gutter in one pass. George Herz & Co. has designed another form for shaping curbs.—Cons Meth, Feb, p46

Spreader Stoker Combined With Oscillating Grate

Spreader stoker, in successful use American Home Foods, Inc., adapts spreader practice the link-grate constr tion long used in underfeed stokers. articulated-link central grate of t Westinghouse-designed unit functions a conveyor to move ash sideward to d charge grates.

Each feeder of the coal-distributi mechanism consists of a pair of positely moving feed rams, which pu coal against spring-loaded equal plates. These reciprocate across stream's face, shredding away coal uniform rate.

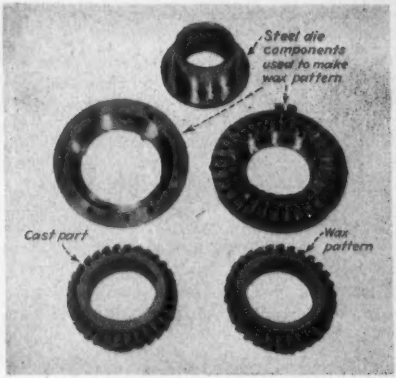
Coal is then propelled to the grate an overthrow rotor. Fuel distribution controlled by rotor speed and adjustm of equalizer plates to cause coal to on desired part of travel arc of ro blades. Thus, the active coal bed be kept thin—1 or 2 in. on top of bed. Air flow is controlled automatic in accordance with steam demand Power, Jan, p88

Breakers Save Face Units

Positive protection is afforded men equipment at Clayton Coal Co. thro use of circuit breakers with ground-t coils. Since installation in mid-19 units have saved their cost by elimin ing cutting-machine damage cau previously by shorts. Units are tamp proof and are designed as dust-tight

Each unit handles a single loading cutting machine. Auxiliary breakers each unit handle drills. Normally units are mounted side by side. B thermal and magnetic trips are provi —Coal Age, Feb, p108

WAX PATTERNS are made in soft metal dies, as shown here, or in machined steel dies



STEEL DIE with multiple inserts makes wax patterns for rotor disks

Design for Precision Casting

Die costs and casting difficulties can be reduced by common-sense design to permit precision casting to compete with other processes

ALL DESIGNERS are not yet completely aware of the possibilities and limitations of precision casting. As a result, many parts are cast to designs intended for other manufacturing processes and cost more. But slight design changes can often reduce these costs.

Each designer should weigh the advantages of precision casting: possible intricate shapes in ferrous and non-ferrous metals, reasonably close tolerances and surface finishes, fabrication of parts with interior cavities connected to outer surfaces by only small openings.

Dimensional accuracy obtainable varies from ±0.003 to ±0.008 in. per in., depending on part size. This does not apply to dimensions on the parting line. Accuracy here depends on the match of the two halves of the steel wax-pattern die or on the flash if a soft metal die is used.

Holes can be cast to the same tolerances. Small holes can be cast in thin sections. Hole diameters in a ¼-in. section may be as small as 0.050 in. If cast holes are reamed, center distance from hole to reference should show a tolerance of not less than ±0.003 in.

For most parts, wall thickness should be not less than 0.045 in. On tapered parts, such as turbine blades, edge thickness may be as little as 0.013 in. Threads should not be cast unless pitch diameter is large, a loose fit is acceptable, and thread length is short.

For economical production, the designer should consider these factors, which affect die costs:

1. Make designs simple as possible.
2. Use straight parting lines, as irregular lines add to die cost. If the part cannot be designed with straight parting lines, soft metal cores should be used.
3. Avoid loose cores. If possible, part should be designed so cores are part of the die.
4. Avoid oblique cores.
5. Allow sufficient draft—¼ to ½°.
6. Locate parting line away from di-

mensions that must be held to close limits.

7. Design for a compact part, as large wax patterns may warp when ejected from the die.

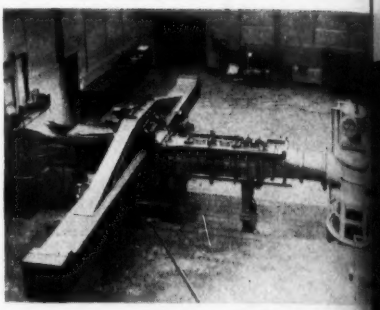
In addition to these considerations, the designer also should watch certain factors that affect quality of castings. Among these are uniform section thickness throughout, no abrupt changes in thickness, corners with radius but not so large as to create a heavy section, and avoidance of deep recesses, long slender cores, and large flat surfaces.—Prod Eng, Feb, p100

Steering Column Gear Lever

Fitzjohn Coach Co. is putting gear shift lever on the steering column of its 36- and 41-passenger buses. Engineers claim driving will be safer and leave more room for driver. Gear hookup is separate from steering column for ease in maintenance.—Am Auto, Mar, p43

LARGE-CAPACITY CONDENSER

This 65,000-sq. ft. condenser is designed to maintain yearly average of 1½-in. Hg. pressure at exhaust ends of double-flow, low-pressure turbine and to remove 630.5-million Btu. per hr. from steam while supplied with 100,000 gpm. water. Built by Worthington Pump & Machinery Corp., it has divided water box to permit inspection or repair of either half while other half is in service. Divided box also allows reversal of circulating water for backwashing the tubes.—Elec World, Jan 29, p95



WIND-TUNNEL SPEED—3,960 MPH.

Air speed of Mach number 5.18, equivalent to 3,960 mph., was achieved by U. S. Navy in captured and modernized German supersonic wind tunnel. Speed was reached at −377° F. in 16-in. square working section of tunnel. Power is supplied by 52-ft. dia. steel sphere emptied to near-vacuum by 300-hp. motor driving two vacuum pumps.—Prod Eng, Feb, p151

Locates Gallstones Quickly

Pennsylvania State College has developed a device to determine whether all gallstones have been removed from bile ducts in gallstone operations. The device consists essentially of an exploring probe connected through an amplifier to a loudspeaker.

The probe's sensing element is a stack of Glenite ceramic piezoelectric elements soldered together in series. When the probe touches a stone, an audible signal is produced. The signal, either a clicking or scratching noise, is readily distinguished from the soft hissing produced when the probe is slid against tissues.—Electronics, Mar, p92

Jet Airliners 3 Yrs. Away

Britain expects to have its de Havilland D. H.-106, swept-wing jet transport airborne by 1951. The 40-passenger liner is designed for 600 mph. at 40,000 ft. It could cross the Atlantic in 6 hr.—Aviation Wk, Jan 24, p32

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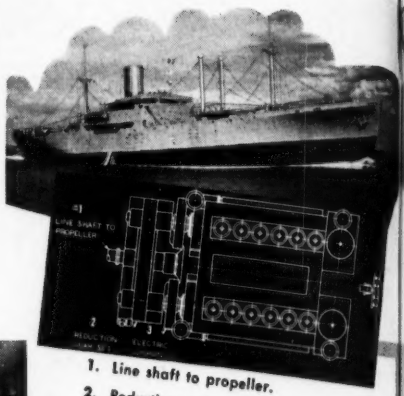
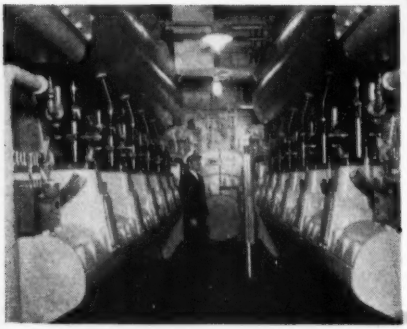
MORE CARGO SPACE for the PAYLOAD!

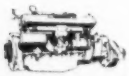


1. Line shaft to propeller.
2. Reduction gear set.
3. Electric or hydraulic couplings.



- LOW PROPELLER SPEED
- MORE CARGO SPACE
- LESS WEIGHT
- GREATER MANEUVERABILITY
- MORE FUEL SPACE
- GREATER CRUISING RANGE

Diesel Engines



Gasoline Engines

Two Nordberg Diesel Engines operating at slightly higher speeds assure the same efficiency of low propeller speed, give greater cargo space, more fuel bunker capacity and assure greater cruising range.

Nordberg Engines driven through electric couplings mean maneuverability that is impossible with direct reversing engines. They permit more than two-thirds normal ship speed should emergency repairs be required at sea.

This design is now in successful operation. Full details on request.

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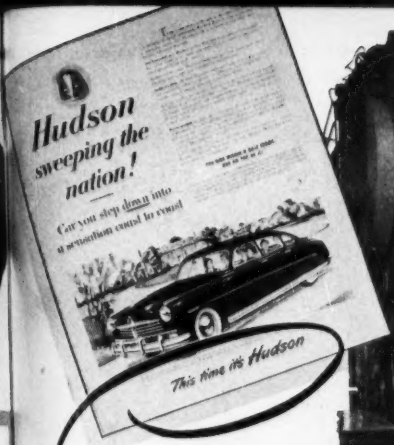
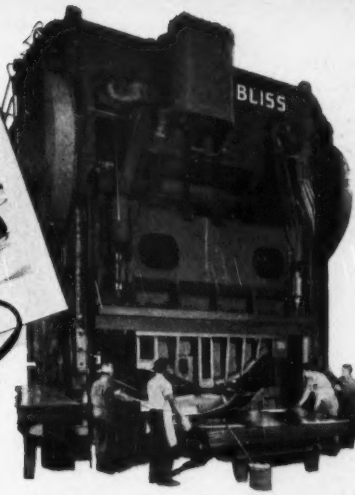
NORDBERG THE WORLD OVER





Triple-action drawing and forming of new Hudson tops in Bliss Toggle Press. Blank is held by outer slide while inner slide forms roof and dwells. Rear window is formed by third action in press bed.

97% BLISS

This time it's Hudson with 650 Bliss-Built Presses

From fender to top, just about every stamped part in a Hudson car is either blanked, formed, drawn or squeezed in one or more of the 650 Bliss-Built presses which total 97% of Hudson's entire press department.

"Bliss presses really stand-up under severe usage," says Hudson's master mechanic. "We have had them working 'around the clock' for several years during the war and since. Yet we have had little down-time due to press failures. They are simple to operate and maintain."

This overwhelming preference for Bliss equipment is duplicated in every pressed-metal-producing industry. It's because Bliss builds and delivers more than a press. Besides pioneering in press-construction improvements, Bliss provides a fund of engineering knowledge, going back over 90 years. "Bliss" on your press is more than a name—it's a guarantee. It will pay you to discuss your press problems with **Bliss.**

E. W. BLISS COMPANY

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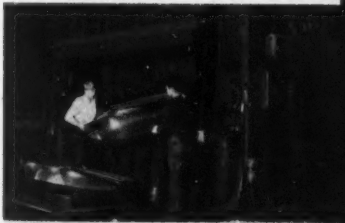
Mechanical and Hydraulic Presses, Rolling Mills, Can and Container Machinery

WORKS AT: Toledo, Cleveland, Salem, Ohio; Hastings, Michigan; Englewood, New Jersey; Derby, England; St. Ouen sur Seine, France.

Large and small end bosses on connecting rods are mass-produced, 133 per hour, on this 1200-ton Bliss-Toledo Knuckle Joint Press.



Double action drawing of front fenders for the new Hudson also takes place in a Bliss-Toledo Toggle Press.

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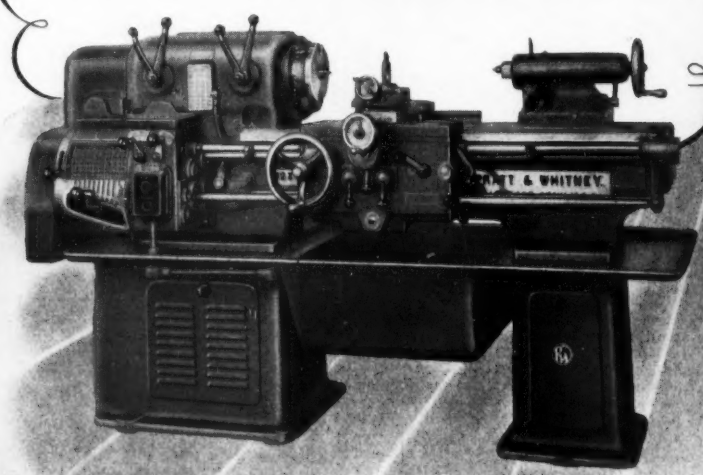

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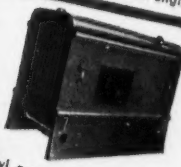
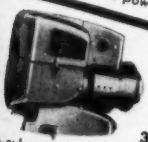
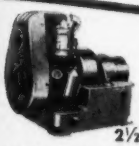


5KW
Four-cyl. gasoline engine powered



3KW
Two-cyl. gasoline engine driven



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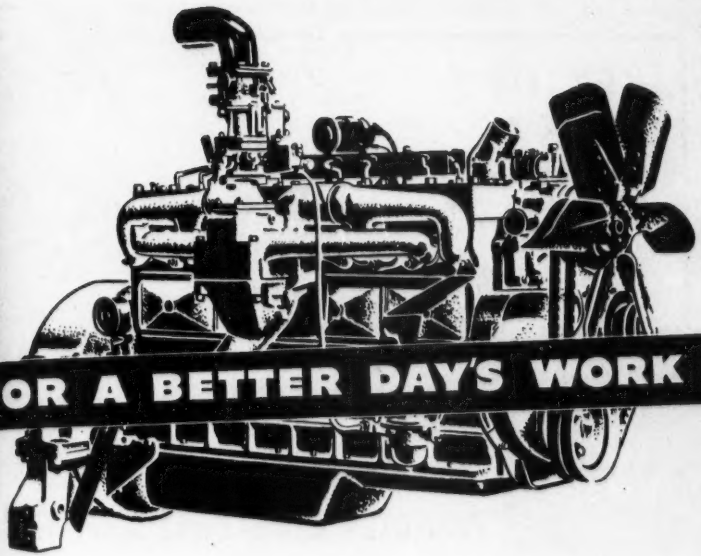

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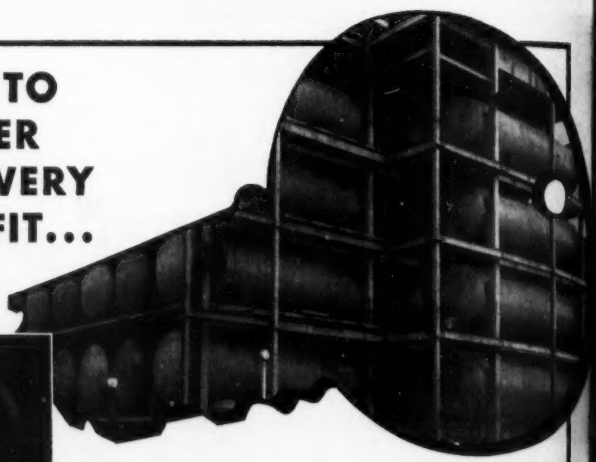

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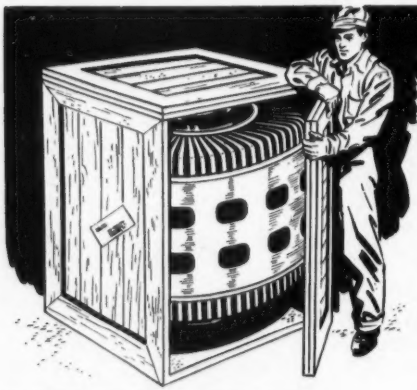

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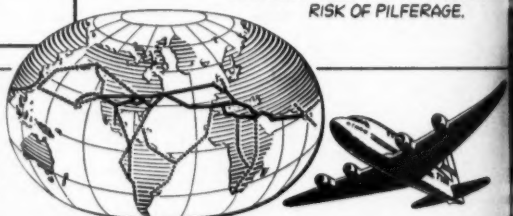

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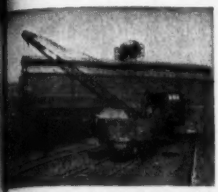

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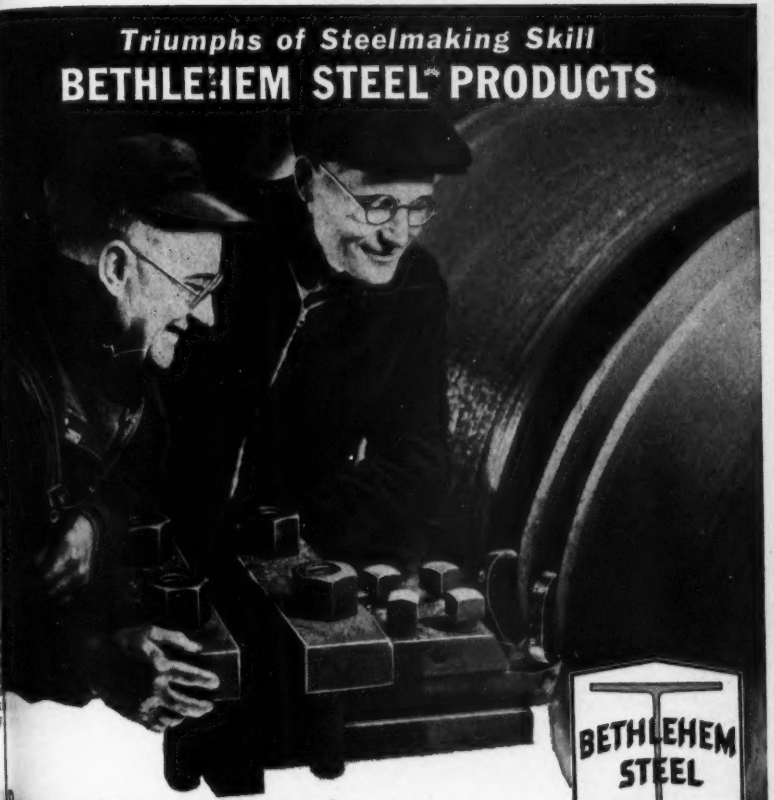

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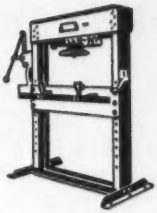

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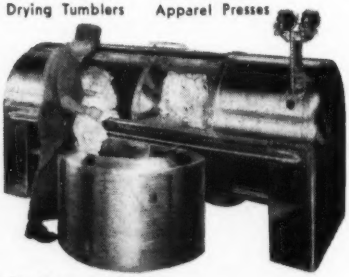

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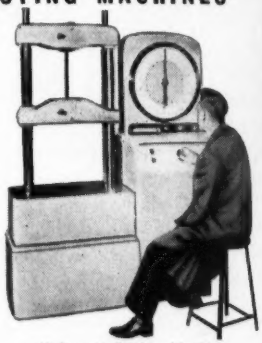

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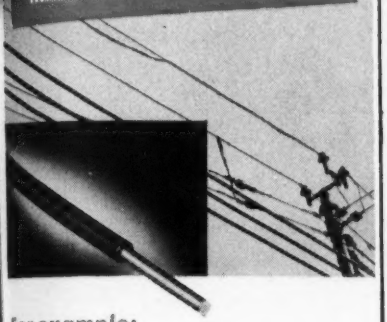
Better rubber products are made with Du Pont NEOPRENE



For example:

New weatherproof wire resists weathering and aging... *will not festoon*

This new weatherproof wire won't rot and festoon. Its smooth, seamless cover is made of Du Pont neoprene. Neoprene withstands chemical vapors, smoke, sunlight and salt spray. With neoprene, wire is clean, light in weight, easy to handle. It lasts longer.

The unusual combination of properties possible with Du Pont neoprene may help you improve *your* product. *Du Pont does not compound neoprene or make the finished products.* We supply neoprene as a raw material to rubber manufacturers and we will be glad to help you locate a source of supply for neoprene goods.

Investigate neoprene's fine possibilities today. Write to E. I. du Pont de Nemours & Co. (Inc.), Organic Chemicals Dept., Export, R-1, Wilmington 98, Delaware, U.S.A.

HERE'S WHY NEOPRENE MAY HELP YOU:

It resists Air and gas diffusion

It resists Sunlight and weathering

It resists Oxidation

It resists Heat and burning

It resists Abrasion, cutting, chipping

It resists Oils, solvents, most chemicals

It resists Low temperature stiffening

FREE! THE NEOPRENE NOTEBOOK —interesting stories, new, unusual applications of neoprene. Write on your business letterhead to E. I. du Pont de Nemours & Co. (Inc.); Organic Chemicals Dept. Export R-1. Wilmington 98, Delaware, U.S.A.

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NEOPRENE

The rubber made by

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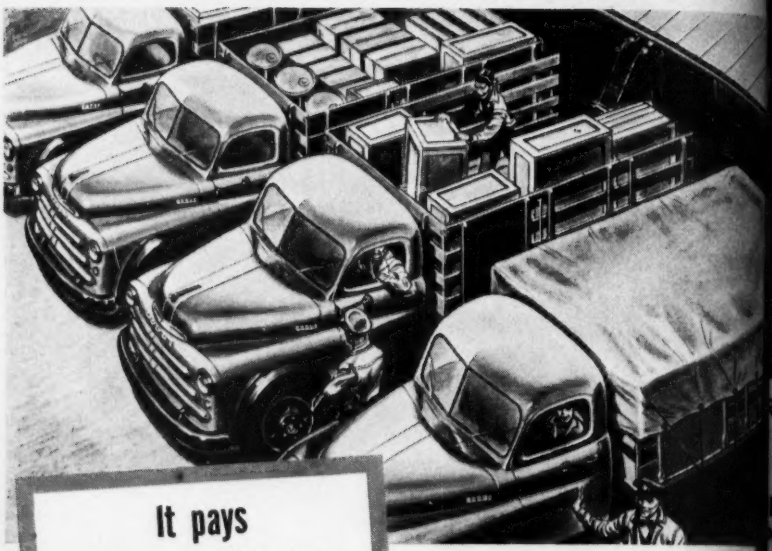

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You can haul bigger loads because of new load distribution. The engine has been moved forward, the front axle back. This allows the rear axle to carry more payload for you.

Your driver can get around faster, For Dodge Trucks are easier to han in tight places . . . at loading do and in heavy traffic. You see, their s cross-steering, plus shortened wh base, give you sharper turning an . . . up to 37 degrees, right or lef

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